SOIL SURVEY OF

Baldwin, Jones, and Putnam Counties, Georgia

United States Department of Agriculture
Soil Conservation Service and Forest Service
In cooperation with
University of Georgia,
College of Agriculture Experiment Stations

This is a publication of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and agencies of the States, usually the Agricultural Experiment Stations. In some surveys, other Federal and local agencies also contribute. The Soil Conservation Service has leadership for the Federal part of the National Cooperative Soil Survey.

Major fieldwork for this soil survey was completed in the period 1967-71. Soil names and descriptions were approved in 1972. Unless otherwise indicated, statements in the publication refer to conditions in the survey area in 1972. This survey was made cooperatively by the Soil Conservation Service, the Forest Service, and the University of Georgia, College of Agriculture Experiment Stations. It is part of the technical assistance furnished to the Piedmont Soil and Water Conservation District.

Soil maps in this survey may be copied without permission, but any enlargement of these maps could cause misunderstanding of the detail of mapping and result in erroneous interpretations. Enlarged maps do not show small areas of contrasting soils that could have been shown at a larger mapping scale.

HOW TO USE THIS SOIL SURVEY

THIS SOIL SURVEY contains information that can be applied in managing farms and woodlands; in selecting sites for roads, ponds, buildings, and other structures; and in judging the suitability of tracts of land for farming, industry, and recreation.

Locating Soils

All the soils of Baldwin, Jones, and Putnam Counties are shown on the detailed map at the back of this publication. This map consists of many sheets made from aerial photographs. Each sheet is numbered to correspond with a number on the Index to Map Sheets.

On each sheet of the detailed map, soil areas are outlined and are identified by symbols. All areas marked with the same symbol are the same kind of soil. The soil symbol is inside the area if there is enough room; otherwise, it is outside and a pointer shows where the symbol belongs.

Finding and Using Information

The "Guide to Mapping Units" can be used to find information. This guide lists all the soils of the three counties in alphabetic order by map symbol and gives the capability classification of each. It also shows the page where each soil is described and the woodland group in which the soil has been placed.

Individual colored maps showing the relative suitability or degree of limitation of soils for many specific purposes can be developed by using the soil map and the information in the text. Translucent material can be used as an overlay over the soil map and colored to show soils that have the same limitation or suitability. For example, soils that have a slight limitation for a given use can be colored green, those with a moderate limitation can be colored yellow, and those with a severe limitation can be colored red.

Farmers and those who work with farmers can learn about use and management of the soils from the soil descriptions and from the section "Use of the Soils for Cultivated Crops and Pasture."

Foresters and others can refer to the section "Use of the Soils for Woodland," where the soils of the county are grouped according to their suitability for trees.

Wildlife managers and others can find information about soils and wildlife in the section "Use of the Soils for Wildlife Habitat."

Community planners and others can read about soil properties that affect the choice of sites for dwellings, industrial buildings, and recreation areas in the section "Use of the Soils in Town and Country Planning."

Engineers and builders can find, under "Engineering Uses of the Soils," tables that contain test data, estimates of soil properties, and information about soil features that affect engineering practices.

Scientists and others can read about how the soils formed and how they are classified in the section "Formation and Classification of the Soils."

Newcomers in Baldwin, Jones, and Putnam Counties may be especially interested in the section "General Soil Map," where broad patterns of soils are described. They may also be interested in the information about the county given in the section "General Nature of the Counties."

Cover: Field of soybeans. The soil is Ailey loamy sand, 2 to 6 percent slopes.

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SOIL SURVEY OF BALDWIN, JONES, AND PUTNAM COUNTIES, GEORGIA

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UNITED STATES DEPARTMENT OF AGRICULTURE, SOIL CONSERVATION SERVICE AND FOREST SERVICE, IN COOPERATION WITH THE UNIVERSITY OF GEORGIA, COLLEGE OF AGRICULTURE EXPERIMENT STATIONS

BALDWIN, JONES, AND PUTNAM COUNTIES are in the central part of Georgia (fig. 1) and are mostly in the southern Piedmont Major Land Resource Area. About one-third of Baldwin and Jones Counties extends across the fall line into the sandhills of the upper Coastal Plain. Milledgeville is the county seat of Baldwin County; 20 miles west is Gray, county seat of Jones County; 20 miles north is Eatonton, county seat of Putnam County.

Drainage for Baldwin, Putnam, and eastern Jones Counties is provided by the Oconee River and its tributaries. The Ocmulgee River drains the western part of Jones County. The total land area is about 1,017 square miles. Almost 11,000 acres has been inundated by Lake Sinclair.

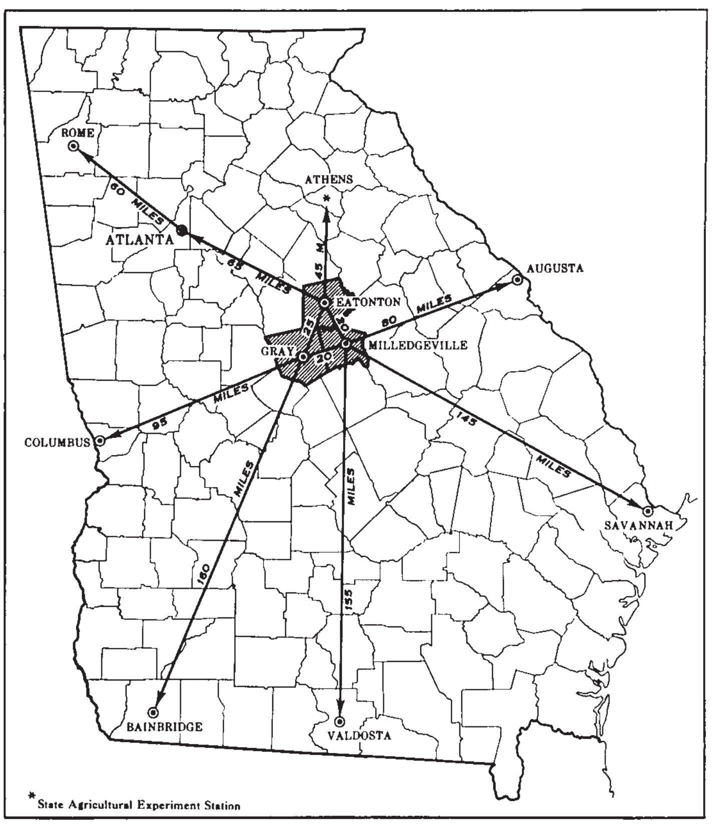

Figure 1.—Location of Baldwin, Jones, and Putnam Counties in Georgia.

The soils of these three counties range from deep to shallow. The soils on uplands range from gently sloping to steep, but soils on flood plains are mainly nearly level and are flooded frequently.

The largest acreage is used for forest. Much of the farm income is derived from sale of livestock and livestock products. There are a number of dairies in Putnam and Jones Counties. The largest acreage of cotton and soybeans is in the southeastern part of Baldwin County.

How This Survey Was Made

Soil scientists made this survey to learn what kinds of soils are in Baldwin, Jones, and Putnam Counties, where they are located, and how they can be used. The soil scientists went into the county knowing they likely would find many soils they had already seen and perhaps some they had not. They observed the steepness, length, and shape of the slopes, the size and speed of streams, the kinds of native plants or crops, the kinds of rock and many facts about the soils. They dug many holes to expose soil profiles. A profile is the sequence of natural layers, or horizons, in a soil; it extends from the surface down into the parent material that has not been changed much by leaching or by the action of plant roots.

The soil scientists made comparisons among the profiles they studied, and they compared these profiles with those in counties nearby and in places more distant. They classified and named the soils according to nationwide, uniform procedures. The *soil series* and the *soil phase* are the categories of soil classification most used in a local survey.

Soils that have profiles almost alike make up a soil series. Except for different texture in the surface layer, all the soils of one series have major horizons that are similar in thickness, arrangement, and other important characteristics. Each soil series is named for a town or other geographic feature

near the place where a soil of that series was first observed and mapped. Cecil and Davidson, for example, are the names of two soil series. All the soils in the United States having the same series name are essentially alike in those characteristics that affect their behavior in the undisturbed landscape.

Soils of one series can differ in texture of the surface layer and in slope, stoniness, or some other characteristic that affects use of the soils by man. On the basis of such differences, a soil series is divided into phases. The name of a soil phase indicates a feature that affects management. For example, Cecil sandy loam, 2 to 6 percent slopes, eroded, is one of several phases within the Cecil series.

After a guide for classifying and naming the soils had been worked out, the soil scientists drew the boundaries of the individual soils on aerial photographs. These photographs show woodlands, buildings, field borders, trees, and other details that help in drawing boundaries accurately. The soil map at the back of this publication was prepared from the aerial photographs.

The areas shown on a soil map are called mapping units. On most maps detailed enough to be useful in planning the management of farms and fields, a mapping unit is nearly equivalent to a soil phase. It is not exactly equivalent, because it is not practical to show on such a map all the small, scattered bits of soil of some other kind that have been seen within an area that is dominantly of a recognized soil phase.

Some mapping units are made up of soils of different series, or of different phases within one series. Two such kinds of mapping units are shown on the soil map of Baldwin, Jones, and Putnam Counties: soil complexes and undifferentiated groups.

A soil complex consists of areas of two or more soils, so intricately mixed or so small in size that they cannot be shown separately on the soil map. Each area of a complex contains some of each of the two or more dominant soils, and the pattern and relative proportions are about the same in all areas. The name of a soil complex consists of the names of the dominant soils, joined by a hyphen. Davidson-Urban land complex is an example.

An undifferentiated group is made up of two or more soils that could be delineated individually but are shown as one unit because, for the purpose of the soil survey, there is little value in separating them. The pattern and proportion of soils are not uniform. An area shown on the map may be made up of only one of the dominant soils, or of two or more. If there are two or more dominant series represented in the group, the name of the group ordinarily consists of the names of the dominant soils, joined by "and." Chewacla and Starr soils is an example.

While a soil survey is in progress, soil scientists take soil samples needed for laboratory measurements and for engineering tests. Laboratory data from the same kind of soil in other places are also assembled. Data on yields of crops under defined practices are assembled from farm records and from field or plot experiments on the same kind of soil. Yields under defined management are estimated for all the soils.

Soil scientists observe how soils behave when used as a growing place for native and cultivated plants, and as material for structures, foundations for structures, or covering for structures. They relate this behavior to properties of the soils. For example, they observe that filter fields for onsite disposal of sewage fail on a given kind of soil, and they relate this to the slow permeability of the soil or its high water table. They see that streets, road pavements, and foundations for houses are cracked on a named kind of soil, and they relate this failure to the high shrink-swell potential of the soil material. Thus, they use observation and knowledge of soil properties, together with available research data, to predict limitations or suitability of soils for present and potential uses.

After data have been collected and tested for the key, or benchmark, soils in a survey area, the soil scientists set up trial groups of soils. They test these groups by further study and by consultation with farmers, agronomists, engineers, and others. They then adjust the groups according to the results of their studies and consultation. Thus, the groups that are finally evolved reflect up-to-date knowledge of the soils and their behavior under current methods of use and management.

General Soil Map

The general soil map at the back of this survey shows, in color, the soil associations in Baldwin, Jones, and Putnam Counties. A soil association is a landscape that has a distinctive proportional pattern of soils. It normally consists of one or more major soils and at least one minor soil, and it is named for the major soils. The soils in one association may occur in another, but in a different pattern.

A map showing soil associations is useful to people who want a general idea of the soils in a county, who want to compare different parts of a county, or who want to know the location of large tracts that are suitable for a certain kind of land use. Such a map is a useful general guide in managing a watershed, a wooded tract, or a wildlife area, or in planning engineering works, recreational facilities, and community development. It is not a suitable map for planning the management of a farm or field, or for selecting the exact location of a road, building, or similar structure, because the soils in any one association ordinarily differ in slope, length, stoniness, drainage, and other characteristics that affect their management.

Soil associations and delineations on the General Soil Map in this soil survey do not always agree fully with general soil maps of adjacent counties published at a different date. Differences are brought about by better knowledge of soils and modifications or refinements in soil series concepts. In addition, the uses of the general soil map have expanded in recent years, thus requiring a more

precise and detailed map to accommodate the need. Still another difference is caused by the range in slope of the soils within an association.

The soil associations in this survey have been grouped into three general kinds of landscapes for broad interpretative purposes. Each of the broad groups and their soil associations in each group are described in the following pages.

Nearly Level Soils on Stream Flood Plains

In the one association of this group, the soils are nearly level and occur on flood plains along the Oconee River, the Ocmulgee River, and larger streams. These soils are brownish to grayish and generally mottled, and they have layers in the profile that range from sandy to loamy. They formed in alluvial sediments washed from soils on uplands.

1. *Chewacla-Congaree-Wehadkee association*

Well drained to poorly drained soils that have loamy layers below the surface layer

This association consists of nearly level soils on stream flood plains in long, narrow bands generally parallel to the streams. It occurs along the Oconee, Ocmulgee, and Little Rivers and some of the larger creeks in Baldwin, Jones, and Putnam Counties. These soils occur on flood plains that are flooded at least once a year.

This association makes up about 9 percent of the survey area. The Chewacla soils make up about 29 percent of the association; Congaree soils 18 percent; Wehadkee soils about 8 percent; and minor soils together about 45 percent.

Chewacla soils are somewhat poorly drained. Typically, the surface layer is reddish-brown silt loam 7 inches thick. Beneath this is brown clay loam 10 inches thick. The next layer is dark-brown silty clay loam that is mottled with yellowish brown and is about 11 inches thick. Beneath this is light grayish-brown silty clay loam mottled with yellowish brown. The seasonal high water table is within 21 inches of the surface for several months each year.

Congaree soils are well drained. The surface layer is brown fine sandy loam about 6 inches thick. The subsurface layer is reddish-brown loam 12 inches thick. Beneath this is strong-brown loamy coarse sand 5 inches thick. The next layer is yellowish-red loam 9 inches thick. Between depths of 32 and 65 inches, the soil is brown or reddish-brown loam, fine sandy loam, or loamy sand.

Wehadkee soils are poorly drained and are in the lower, wetter parts of the association. Typically, the surface layer is brown loam 9 inches thick. The next layer is gray, mottled sandy clay loam about 34 inches thick. The underlying layer, extending to a depth of 54 inches, is gray, mottled sandy clay loam.

Significant minor soils of this association are the well-drained Starr soils, the sandy Buncombe soils that formed in recent alluvium, and soils similar to Chewacla and Wehadkee soils.

Wetness and flooding are the main limitations of this association; however, if protected from flooding and drained, this association can be farmed. A small percentage of the association is used for crops, and only slightly more is used for pasture. The rest is in hardwood forest. No farms are entirely within the association, since most include some soils on uplands.

Because of flooding and wetness, this association has mainly severe limitations for house sites, light industry, and other uses associated with community development. The association has severe limitations for campsites, play areas, and similar recreational uses.

Very Gently and Gently Sloping Soils of the Uplands

In the seven soil associations of this group, the soils occur chiefly on ridgetops and interstream divides. Slopes, typically, range from 2 to 10 percent. The subsoil or underlying layers range from reddish to brownish or grayish in color. In associations 2, 3, 4, and 5, the soils formed in residual parent material that weathered from such rocks as granite, gneiss, diorite, quartz, mica, and feldspar. In associations 6, 7, and 8, the soils formed in sand and clay of marine origin.

2. *Davidson association*

Well-drained soils that have dark-red clayey layers below the surface layer

This association consists of long, broad, very gently sloping to gently sloping ridgetops and interstream divides. The larger areas are in the northern part of Jones County and western part of Putnam County. Approximately 60 percent of the association has slopes of 2 to 6 percent, and the rest has slopes of 6 to 10 percent.

This association makes up about 22 percent of the survey area. Davidson soils are the only major soils in the association.

Typically, the surface layer is dark reddish-brown loam 7 inches thick. The next layer is dark-red clay loam 5 inches thick. This is underlain by dark-red clay that extends to a depth of 72 inches. Depth to hard rock is generally more than 20 feet.

The minor soils of this association are the well-drained Cecil, Vance, Enon, and Gwinnett soils. The Cecil soils have a red clayey subsoil. The Vance soils have a thinner surface layer and subsoil and tougher, firmer, and more plastic underlying material than the Davidson soils. The Enon soils are more plastic in the subsoil, when wet, than the Davidson soils. Gwinnett soils are underlain by material weathered from basic and acidic rocks at a depth of less than 40 inches.

Most of this association is in forest; however, there are a few dairy and beef cattle farms and others that carry on general farming operations. Because of the very gentle to gentle slopes, this association is suited to farming and responds to good management practices. Farms in this association average about 300 acres.

The major soils of the association have moderate limitations if used for homesites, campsites, picnic

areas, intensive play areas, and sites for light industry. Limitations are moderate to severe for construction of oxidation ponds.

3. *Cecil-Vance association*

Well-drained soils that have red to yellowish-red clayey layers below the surface layer

This association consists of very gently sloping to gently sloping, broad to narrow ridgetops and side slopes that extend down to small, narrow, winding drainageways. It occurs in several large areas, mostly in the central and western part of the counties. Slightly more than half of this association has slopes of 2 to 6 percent, and the rest has slopes of 6 to 10 percent.

This association makes up about 19 percent of the survey area. Cecil soils make up about 60 percent of the association, Vance soils about 30 percent, and minor soils 10 percent.

Typically, in the Cecil soils, the surface layer is reddish-brown sandy loam 8 inches thick. Below this is yellowish-red sandy clay loam 4 inches thick. The next layer is 48 inches thick. It is red clay loam in the upper 4 inches, red clay in the middle 28 inches, and red clay loam in the lower 16 inches. The underlying material is saprolite. Depth to hard rock is generally more than 15 feet.

In the Vance soils, the surface layer is typically light brownish-gray and brownish-yellow sandy loam 7 inches thick. Beneath this is yellowish-red, very firm clay, 30 inches thick, that is mottled with strong brown and red and, in the lower part, also with gray. The underlying material is streaked and mottled, reddish-yellow, strong-brown, and light-gray, weathered rock. Depth to hard rock is generally more than 10 feet.

The minor soils of this association are mainly the well-drained Davidson soils that typically have a dark-red, clayey subsoil and the moderately well drained Helena soils that have a brownish, clayey subsoil. Chewacla, Congaree, and Wehadkee soils are along the small, narrow drainageways that dissect the association.

Most of the farms in this association are about 250 acres in size and consist largely of cutover forest. There are, however, a few dairy and beef cattle farms in the association. A small acreage is occupied by private dwellings and small businesses. This association can be used for cultivated crops; the potential for farming is good.

Most of this association has slight or moderate limitations for uses associated with community development and recreational purposes, but the Vance soils have moderate and severe limitations for these uses because of the kind and amount of clay in them.

4. *Helena-Enon-Wilkes association*

Moderately well drained and well drained soils that have yellowish-brown, strong-brown, grayish-brown, or light olive-brown clayey layers below the surface layer

This association consists of narrow to fairly broad, very gently sloping to gently sloping ridgetops. It is in several tracts scattered throughout the survey area. About half of this association has slopes of 2 to 6 percent, and the rest has slopes of 6 to 10 percent.

This association makes up about 3 percent of the survey area. The Helena soils make up about 45 percent of the association, Enon soils 30 percent, Wilkes soils 15 percent, and minor soils about 10 percent.

The Helena soils are moderately well drained. Typically, the surface layer is yellowish-brown sandy loam 3 inches thick. Below this is strong-brown clay, 9 inches thick, that is mottled with red. The next layer is yellowish-brown clay, 21 inches thick, that is mottled with shades of gray, brown, and white. The next layer, extending to a depth of 48 inches, is mottled light-gray, white, yellowish-brown, and strong-brown sandy clay. The underlying material, extending to a depth of 60 inches, is gray, yellow, and brown material weathered from gneiss and apatitic granite. Depth to hard rock ranges from 3 to 15 feet.

The Enon soils are well drained. Typically, the surface layer is dark grayish-brown sandy loam about 4 inches thick. The next layer is 27 inches thick. It is yellowish-brown clay in the upper 12 inches, yellowish-brown clay mottled with shades of brown and red in the middle 13 inches, and grayish-brown clay mottled with red and yellowish brown in the lower 2 inches. The underlying material, extending to a depth of 60 inches, is strong-brown, light-gray, and red, highly weathered rock. Depth to hard rock is generally more than 10 feet.

The Wilkes soils are well drained. Typically, the surface layer is dark grayish-brown sandy loam 2 inches thick. The subsurface layer is yellowish-brown sandy loam 4 inches thick. Beneath this is a layer of light olive-brown sandy clay loam 4 inches thick. This is underlain by light olive-brown clay, 7 inches thick, that has fine black mottles. The underlying material, extending to a depth of 45 inches, is material partly weathered from acid and basic rocks. Intermittent hard rock is between depths of 30 to about 48 inches.

The minor soils of this association are the well-drained Vance soils, the poorly drained Wehadkee soils, and somewhat poorly drained soils that are similar to the Chewacla soils.

Most of the farms in this association are operated part time by the owner. The farms are small and are used mainly for young pine trees and improved pasture. The major soils are not the most desirable for farming. A large acreage is in residential subdivisions, small businesses, and small manufacturing plants.

This association has mainly moderate and severe limitations for uses associated with community development. It has mainly moderate and slight limitations for the more common recreational uses, such as campsites and picnic areas.

5. *Iredell-Enon association*

Well drained to somewhat poorly drained soils that have light olive-brown, grayish-brown, and yellowish-brown, mottled clayey layers below the surface layer

This association consists chiefly of broad areas of

very gently sloping soils. This small association is distinctly different from others because of the major soils and the very gently sloping landscape. It occurs in the northern part of Putnam and Jones Counties. Slopes range from 2 to 10 percent. In more sloping areas, the surface drainage is fair, but in the nearly level areas, water tends to pond on the surface.

This association makes up less than 1 percent of the survey area. Iredell soils make up about 24 percent of the association, Enon soils 23 percent, and minor soils about 53 percent.

Iredell soils are moderately well drained to somewhat poorly drained. Typically, the surface layer is very dark grayish-brown loam and the subsurface layer is dark grayish-brown sandy loam. These layers together are 7 inches thick. The next layer, extending to a depth of 25 inches, is light olive-brown clay that is very plastic when wet. It is mottled with olive gray in the lower part. The underlying material is dark-colored basic rock that is neutral in reaction. Depth to hard rock is generally more than 6 feet.

The Enon soils are well drained. Typically, the surface layer is dark grayish-brown sandy loam 4 inches thick. The next layer is 27 inches thick. It is yellowish-brown clay in the upper 12 inches, yellowish-brown clay mottled with shades of brown and red in the middle 13 inches, and grayish-brown clay mottled with red and yellowish brown in the lower 2 inches. The underlying material, extending to a depth of 60 inches, is strong-brown, light-gray, and red, highly weathered rock. Depth to hard rock is generally more than 10 feet.

The minor soils of this association are chiefly Helena soils on uplands and, to a lesser extent, Wehadkee and Chewacla soils in the narrow stream bottom lands.

This association is mainly used for pasture (fig. 2), forest, and small grain. The steeper areas are in blackjack oak, post oak, and shortleaf pine. Most of this association is within the Central Georgia Branch Experiment Station. There are some farms, mainly dairy and beef cattle farms.

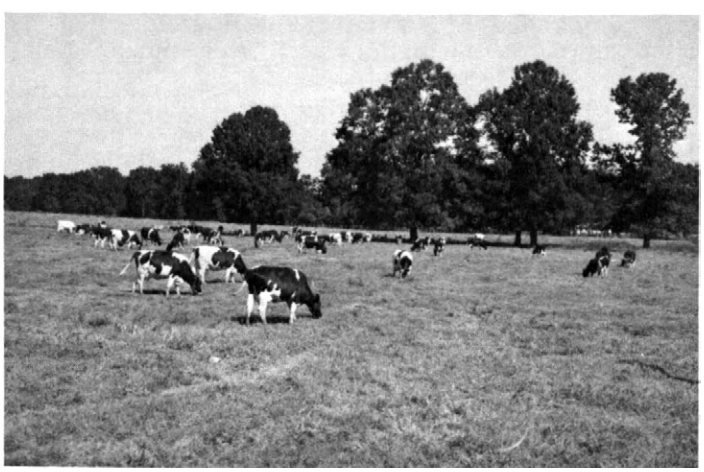

Figure 2.—Pasture on soils of the Iredell-Enon association.

Because the subsoil in the major soils is clayey, this association has mostly severe limitations for community development uses, such as foundations for dwellings and septic tank absorption fields. It has slight to severe limitations for the more common recreational uses, such as campsites and playgrounds.

6. *Ailey-Lakeland association*

Well drained to excessively drained soils that have yellowish-brown to strong-brown loamy layers below the surface layer

This association consists of large and medium-sized areas of very gently sloping to sloping upland interstream divides. It occurs mainly in the southern part of Baldwin and Jones Counties. Most of the major soils have a thick, sandy surface layer. Slopes range from 2 to 10 percent.

This association makes up about 6 percent of the survey area. Ailey soils make up 46 percent of the association, Lakeland soils about 38 percent, and minor soils together about 16 percent.

The Ailey soils are well drained and occur mainly on the middle and upper parts of the slopes. Typically, the surface layer is dark grayish-brown loamy sand 5 inches thick. The next layer is yellowish-brown loamy sand that extends to a depth of 29 inches. The next layer is yellowish-brown sandy clay loam 13 inches thick. Below this, and extending to a depth of 48 inches, is a firm, brittle, slightly cemented fragipan of yellowish-brown, mottled sandy clay loam. Between depths of 48 and 65 inches is strong-brown, firm, cemented, and brittle, sandy clay loam mottled with shades of red and gray.

The Lakeland soils are excessively drained and occur chiefly on the crests and upper parts of the interstream divides. Typically, these soils are sandy to a depth of about 86 inches. The surface layer is very dark grayish-brown sand about 6 inches thick. The subsurface layer is brown and about 8 inches thick. The next layer is yellowish brown and extends to a depth of 41 inches. The next layer, extending to a depth of 52 inches, is light yellowish brown. Below this, to a depth of about 86 inches, is very pale brown sand.

The minor soils of this association are the well-drained Norfolk, Vaucluse, or similar soils on uplands and the Chewacla and Wehadkee soils in the bottom lands of the small drainageways.

Approximately one-third of the acreage is in cultivated crops or pasture, and the rest is in cutover stands of mixed pines. Hardwoods are in the more sloping parts, and young pine plantations are on the gently sloping soils that were formerly in cultivated crops. This association is made up of small to medium-sized farms and large tracts of timberlands owned by both individuals and timber companies.

This association has mainly moderate to slight limitations if used for homesites, sites for light industry, or other uses commonly associated with community development. Limitations are mainly moderate or severe for recreational uses, such as campsites and picnic areas.

7. ***Orangeburg-Norfolk-Red Bay association***

Well-drained soils that have dark-red, red, and yellowish-brown loamy layers below the surface layer

This association consists of broad, nearly level to very gently sloping ridgetops and gently sloping side slopes adjacent to the small drainageways that dissect the landscape. It occurs in the southern part of Baldwin and Jones Counties in small areas. About 70 percent of the association has slopes of 0 to 6 percent, and the rest has slopes of 6 to 15 percent.

This association makes up about 5 percent of the survey area. Orangeburg soils make up about 32 percent of the association, Norfolk soils 27 percent, Red Bay soils 15 percent, and minor soils together about 26 percent.

Orangeburg soils typically have a surface layer of very dark grayish-brown loamy sand 6 inches thick. The subsurface layer is brown sandy loam 11 inches thick. The next layer is friable, red and dark-red sandy clay loam about 63 inches thick. Depth to hard rock is more than 20 feet.

Norfolk soils typically have a surface layer of dark grayish-brown loamy sand 10 inches thick. Below this is a layer of brownish-yellow sandy loam 7 inches thick. The next layer is yellowish-brown sandy clay loam about 60 inches thick. It is mottled with strong brown and yellowish red in the middle and with red, strong brown, and light gray in the lower part. Depth to hard rock is more than 20 feet.

Red Bay soils typically have a surface layer of dark reddish-brown loamy sand about 8 inches thick. Beneath this is dark-red sandy clay loam 64 inches thick.

The minor soils of this association are mainly the excessively drained Lakeland soils on ridgetops and side slopes, the well-drained Congaree soils in depressions and drainageways, and the well-drained Vaucluse soils on knolls and breaks.

Approximately 30 percent of this association is cultivated or pastured; 60 percent is in forest or idle; and the rest is used for residential subdivisions, small businesses, or small industrial plants. Soils in this association are some of the best in the area for farming.

The major soils of the association have mainly slight limitations if used for homesites and other uses commonly associated with community development. They have slight limitations for campsites, picnic areas, and similar recreational uses.

8. ***Susquehanna-Vaucluse-Lakeland association***

Somewhat poorly drained to excessively drained soils that have grayish, mottled clayey layers or brownish loamy or sandy layers below the surface layer

This association consists of short, narrow, very gently sloping ridgetops and gently sloping side slopes. It occurs chiefly in the southern part of Jones County. Many, small, branching drainageways have deeply dissected the area. Nearly all of the association has slopes of 2 to 10 percent, but on a few side slopes that adjoin drainageways, slopes are slightly more than 10 percent.

This association makes up about 1 percent of the survey area. The Susquehanna soils make up about 40 percent of the association; Vaucluse soils about 30 percent; Lakeland soils 10 percent; and minor soils together about 20 percent.

Susquehanna soils are somewhat poorly drained and occur on the lower parts of hillsides near the small drainageways. Typically, the surface layer is brown fine sandy loam about 5 inches thick. The next layer, extending to a depth of about 80 inches, is clay or sandy clay. It is yellowish red and red mottled with shades of brown in the upper part, mottled yellowish brown, red, and gray in the middle part; and gray mottled with red in the lower part. When these soils are wet, they are very plastic and sticky.

Vaucluse soils are well drained and occur throughout the association. Typically, the surface layer is brown loamy sand about 3 inches thick. The subsurface layer is yellowish-brown loamy sand about 6 inches thick. The next layer is about 53 inches thick. In sequence from the top, the upper 8 inches of this layer is yellowish-red sandy clay loam; the next 10 inches is yellowish-red, firm sandy clay loam that has red, strong-brown, yellowish-red, yellow, and brownish-yellow mottles; and the lower 17 inches is firm, mottled sandy clay loam.

Lakeland soils are excessively drained and occur chiefly on the crests of ridges. Typically, the surface layer is very dark grayish-brown sand 6 inches thick. The subsurface layer is brown, loose sand 8 inches thick. The next layer, extending to a depth of 86 inches, is sand. It is yellowish brown in the upper part, light yellowish brown in the middle part, and very pale brown in the lower part.

The minor soils of this association are the well-drained Ailey soils on ridges and the wet Wehadkee and Chewacla soils in narrow drainageways.

Only a small acreage of this association is used for cultivated crops or pasture; the rest is in pines. The Susquehanna soils are seldom used for cultivated crops, and are not suited to them but are used for pasture and trees. The farms commonly are small, and many owners are employed in Milledgeville or Macon.

This association has moderate to severe limitations or hazards for farming and most uses related to community development and recreation.

Strongly Sloping and Steep Soils of the Uplands

In the four soil associations of this group, the soils are strongly sloping and steep and occur mainly on hillsides and narrow ridgetops. Slopes typically range from 10 to 35 percent. The soils range from deep to shallow. They are dominantly brownish to reddish in the subsoil or underlying layers, and the texture ranges from sandy to clayey. The soils in associations 9, 10, and 11 formed in residual parent material weathered from such rocks as hornblende gneiss, quartz, mica, schist, and diorite. The soils in association 12 formed in sandy, loamy, and clayey marine sediments.

9. *Davidson-Gwinnett-Wilkes association*

Well-drained soils that have dark-red to light olive-brown clayey layers below the surface layer

This association consists of moderately steep to steep, short side slopes adjacent to the drainageways that join in a treelike pattern. The largest acreage is in the northern part of Jones and northwestern part of Putnam Counties. Narrow flood plains are along the streams. Most of the association is eroded. In the more severely eroded areas, erosion has removed all or nearly all of the original surface layer and has exposed the subsoil. About half of the association has slopes that range chiefly from 10 to 15 percent, and the rest has slopes of 15 to 25 percent.

This association makes up about 13 percent of the survey area. Davidson soils make up about 70 percent of the association, Gwinnett soils 10 percent, Wilkes soils about 10 percent, and minor soils together about 10 percent.

Davidson soils typically have a surface layer of dark reddish-brown loam 7 inches thick. Below this, and extending to a depth of about 60 inches, is chiefly dark-red clay.

Gwinnett soils typically have a surface layer of dark reddish-brown loam 3 inches thick. The subsurface layer is dark reddish-brown clay loam about 3 inches thick. The next layer is dark-red clay 32 inches thick. The underlying material consists of partly weathered basic rock. Depth to hard rock is generally more than 6 feet.

Wilkes soils typically have a surface layer of dark grayish-brown sandy loam 2 inches thick. The subsurface layer is yellowish-brown sandy loam 4 inches thick. The next layer is light olive-brown sandy clay loam 4 inches thick, and beneath this is light olive-brown clay, 7 inches thick, that has fine black mottles. The underlying material, extending to a depth of 45 inches, is partly weathered material from acid and basic rocks. Intermittent hard rock is between depths of 30 and about 48 inches.

The minor soils of this association are strongly sloping Cecil and Vance soils and nearly level Chewacla and Congaree soils along narrow drainageways.

Almost all of this association is in forest, including some of the Oconee National Forest. Slopes are generally too steep for extensive farming.

The association is considered to have moderate or severe limitations if used for homesites and similar purposes associated with community development. Limitations are mainly severe for campsites, play areas, and similar recreational uses.

10. *Cecil-Vance association*

Well-drained soils that have red to yellowish-red, mottled clayey layers below the surface layer

This association consists of moderately steep to steep soils that extend down to the numerous well-defined drainageways. It occurs in several areas, especially in the northern part of Putnam County, the central and eastern and western parts of Jones County, and throughout northern Baldwin County. About half of the association has slopes of 10 to 15 percent; the rest has slopes of 15 percent or more.

This association makes up about 9 percent of the survey area. Cecil soils make up about 75 percent of the association, Vance soils 18 percent, and minor soils together about 7 percent.

Cecil soils typically have a surface layer of reddish-brown sandy loam 8 inches thick. Below this is a layer of yellowish-red sandy clay loam 4 inches thick. The next layer is 48 inches thick. It is red clay loam in the upper 4 inches, red clay in the middle 28 inches, and red clay loam in the lower 16 inches. The underlying material is saprolite. Depth to hard rock is generally more than 15 feet.

Vance soils typically have a surface layer of light brownish-gray and brownish-yellow sandy loam 7 inches thick. Beneath this is a layer of yellowish-red, very firm clay, 30 inches thick, that is mottled with strong brown and red and, in the lower part, with gray. The underlying material is streaked and mottled, reddish-yellow, strong-brown, and light-gray weathered rock. Depth to hard rock is generally more than 10 feet.

The major soils are eroded, but included in the association are severely eroded areas. In these areas almost all of the original surface layer and some of the clayey subsoil is gone. The surface layer is generally sandy clay loam or clay loam because it has been mixed with part of the subsoil by tillage. Gullies are common, and a few cannot be crossed by farm implements or logging machines.

The minor soils of this association are mainly Davidson, Helena, and Wilkes soils.

Most of this association is in large, privately owned timber tracts and the Oconee National Forest. There are a few medium-sized dairy and beef cattle farms. Because of slope, this association does not have a high potential for farming.

The association has severe limitations if used for homesites, light industry, and similar uses associated with community development. Limitations are moderate or severe for campsites, intensive play areas, and similar recreational uses.

11. *Wilkes-Vance association*

Well-drained soils that have light olive-brown to yellowish-red, mottled clayey layers below the surface layer

This association consists of narrow ridgetops and steep areas on side slopes. Depth to hard rock is less than 36 inches in about 20 percent of the area. This association is in several widely scattered areas throughout the three counties. Approximately half the association has slopes of 8 to 15 percent, and slightly less has slopes of 15 to 25 percent.

This association makes up about 8 percent of the survey area. The Wilkes soils make up 70 percent of the association, Vance soils 7 percent, and minor soils 23 percent.

Wilkes soils typically have a surface layer of dark grayish-brown sandy loam 2 inches thick. The subsurface layer is yellowish-brown sandy loam 4

inches thick. The next layer is light olive-brown sandy clay loam 4 inches thick. Below this is light olive-brown clay, 7 inches thick, that has fine black mottles. The underlying material, extending to a depth of 45 inches, is partly weathered acid and basic rocks. Intermittent hard rock is between depths of 30 and about 48 inches.

Vance soils typically have a surface layer of light brownish-gray and brownish-yellow sandy loam 7 inches thick. Beneath this is a layer of yellowish-red, very firm clay, 30 inches thick, that is mottled with strong brown and red and with gray in the lower part. The underlying material is streaked and mottled, reddish-yellow, strong-brown, and light-gray, weathered rock. Depth to hard rock is generally more than 10 feet.

The minor soils of this association are mainly Pacolet, Helena, and Cecil soils.

Approximately 90 percent of this association is in pine trees or mixed hardwoods, and the rest is idle or urban. Farms are mostly small. This association is used mostly for pasture and woodland. It is seldom used for row crops because of slope and the shallow depth to rock in many places.

The major soils of this association have severe limitations if used for homesites, light industries, or other uses associated with community development. Limitations range from slight to severe for recreational uses, such as campsites, play areas, and paths and trails.

12. *Esto-Lakeland-Ailey association*

Well-drained to excessively drained soils that have reddish-yellow, light yellowish-brown, and yellowish-brown, mottled clayey or loamy layers below the surface layer

This association consists of strongly sloping soils on ridgetops and steep soils on side slopes that extend down to the numerous, small, winding drainageways that dissect the area. It occurs in the southern parts of Baldwin and Jones Counties. Slightly more than half of the association has slopes of about 10 to 15 percent; the rest has slopes of 15 to 25 percent.

This association makes up about 4 percent of the survey area. Esto soils make up about 50 percent of the association, Lakeland soils 16 percent, Ailey soils 8 percent, and minor soils 26 percent.

Esto soils are well drained and are on the steeper, choppy, irregular parts adjacent to the drainageways. Typically, the surface layer is dark grayish-brown loamy sand 3 inches thick. The subsurface layer is light yellowish-brown loamy sand 7 inches thick. The next layer is reddish-yellow sandy clay loam about 6 inches thick. Below this, and extending to a depth of 72 inches, is sandy clay. It is reddish-yellow in the upper 20 inches, reddish yellow and mottled with shades of yellow and gray in the middle 20 inches, and mottled yellowish brown, reddish yellow, strong brown, and light gray in the lower part. Depth to hard rock is more than 10 feet.

Lakeland soils are excessively drained and occur throughout the association. Typically, the surface layer is very dark grayish-brown sand 6 inches thick; the subsurface layer is brown loose sand 8 inches thick. The next layer, extending to a depth of 86 inches, is sand. It is yellowish brown in the upper part, light yellowish brown in the middle, and very pale brown in the lower part. Depth to hard rock is more than 20 feet.

Ailey soils are well drained and occur on both the ridgetops and hillsides. Typically, the surface layer is dark grayish-brown loamy sand 5 inches thick. The next layer is yellowish-brown loamy sand that extends to a depth of 29 inches. The next layer is yellowish-brown sandy clay loam 13 inches thick. Below this, and extending to a depth of 48 inches, is a firm, brittle, and slightly cemented fragipan of yellowish-brown, mottled sandy clay loam. Between depths of 48 and 65 inches is strong-brown, firm, cemented, and brittle sandy clay loam mottled with shades of red and gray. Depth to hard rock is generally more than 8 feet.

The minor soils of this association are the well-drained Vaucluse and Norfolk soils and similar soils.

Most of this association is in timber tracts that consist of mixed stands of pines and hardwoods. Because of steepness, this association does not have a high potential for farming.

This association has moderate to severe limitations if used for homesites, light industry, and other uses associated with community development. It has mainly severe limitations for campsites and play areas and similar recreational uses.

Descriptions of the Soils

In this section the soil series and mapping units of Baldwin, Jones, and Putnam Counties are described. Each soil series is described in considerable detail, and then, briefly, the mapping units in that series. Unless it is specifically mentioned otherwise, it is to be assumed that what is stated about the soil series holds true for the mapping units in that series. Thus, to get full information about any one mapping unit, it is necessary to read both the description of the mapping unit and the description of the soil series to which it belongs.

An important part of the description of each soil series is the soil profile, that is, the sequence of layers from the surface downward to rock or other underlying material. Each series contains two descriptions of this profile. The first is brief and in terms familiar to the layman. The second, much more detailed, is in technical terms for scientists, engineers, and others who need to make thorough and precise studies of soils. Unless it is otherwise stated, the colors given in the descriptions are those of a moist soil. The profile described in the soil series is representative for mapping units in that series. If a given mapping unit has a profile in some ways different from the one described in the series, these differences are stated in the description of the mapping unit, or they are apparent in the name of the mapping unit.

Following the name of each mapping unit is a symbol in parentheses. This symbol identifies the

mapping unit on the detailed soil map. Listed at the end of each description of a mapping unit are the capability unit and woodland suitability group in which the mapping unit has been placed. The page for the description of each capability unit can be learned by referring to the "Guide to Mapping Units" at the back of this survey.

The acreage and proportionate extent of each mapping unit are shown in table 1. Many of the terms used in describing soils can be found in the Glossary, and more detailed information about the terminology and methods of soil mapping can be obtained from the Soil Survey Manual (*5*).[1]

[1] Italic numbers in parentheses refer to Literature Cited, p.

Descriptions, names, and delineations of soils in this soil survey do not fully agree with those of the soil maps in nearby counties published at different dates. Differences are the result of better knowledge of soils, modifications in series concepts, intensity of mapping, and the extent of soils in the survey area. In some places it is more feasible to combine all acreages of similar soils that respond in much the same way as to use and management than it is to separate them.

Ailey Series

The Ailey series consists of well-drained soils that are sandy to a depth of about 29 inches. These soils

TABLE 1.—*Approximate acreage and proportionate extent of the soils.*

Soil	Baldwin County	Jones County	Putnam County	Total area	Total extent
	Acres	*Acres*	*Acres*	*Acres*	*Percent*
Ailey loamy sand, 2 to 6 percent slopes	6,490	4,105	0	10,595	1.6
Ailey loamy sand, 6 to 10 percent slopes	3,985	2,745	0	6,730	1.0
Ailey soils, 10 to 15 percent slopes	2,780	1,190	0	3,970	.6
Ailey and Norfolk loamy sands, 2 to 10 percent slopes	4,305	1,160	0	5,465	.8
Buncombe loamy sand	480	455	260	1,195	.2
Cecil cobbly sandy loam, 2 to 10 percent slopes	0	0	4,530	4,530	.7
Cecil sandy loam, 2 to 6 percent slopes, eroded	7,860	4,395	9,860	22,115	3.4
Cecil sandy loam, 6 to 10 percent slopes, eroded	2,650	1,635	5,025	9,310	1.4
Cecil sandy loam, 10 to 25 percent slopes, eroded	4,580	3,995	9,520	18,095	2.8
Cecil sandy clay loam, 2 to 6 percent slopes, eroded	5,150	2,970	6,110	14,230	2.2
Cecil sandy clay loam, 6 to 10 percent slopes, eroded	8,040	6,195	15,565	29,800	4.6
Cecil sandy clay loam, 10 to 25 percent slopes, eroded	11,509	5,997	9,751	27,257	4.2
Chewacla and Starr soils	6,205	11,495	10,790	28,490	4.4
Congaree and Toccoa soils	5,565	8,695	11,920	26,180	4.0
Davidson loam, 2 to 6 percent slopes, eroded	8,735	33,235	27,550	69,520	10.7
Davidson loam, 6 to 10 percent slopes, eroded	860	6,590	5,750	13,200	2.0
Davidson clay loam, 6 to 10 percent slopes, eroded	4,600	27,350	24,470	56,420	8.7
Davidson clay loam, 10 to 25 percent slopes, eroded	4,865	33,860	23,825	62,550	9.6
Davidson-Urban land complex, 2 to 10 percent slopes	1,210	230	815	2,255	.4
Enon-Urban land complex, 5 to 12 percent slopes	1,265	0	30	1,295	.2
Enon soils, 2 to 6 percent slopes, eroded	1,740	1,405	1,305	4,450	.7
Enon soils, 6 to 10 percent slopes, eroded	1,530	1,550	1,090	4,170	.6
Esto soils, 10 to 25 percent slopes	2,860	10,345	0	13,205	2.0
Gwinnett loam, 15 to 35 percent slopes, eroded	375	3,860	3,605	7,840	1.2
Helena sandy loam, 2 to 6 percent slopes, eroded	2,535	1,110	1,695	5,340	.8
Helena complex, 6 to 10 percent slopes, eroded	3,340	1,470	3,730	8,540	1.3
Iredell loam, 2 to 6 percent slopes	0	210	1,250	1,460	.2
Lakeland sand, 2 to 10 percent slopes	7,115	9,275	0	16,390	2.5
Lakeland sand, 10 to 15 percent slopes	2,600	1,705	0	4,305	.7
Norfolk loamy sand, 0 to 2 percent slopes	945	295	0	1,240	.2
Norfolk loamy sand, 2 to 6 percent slopes	4,450	1,310	0	5,760	.9
Norfolk loamy sand, 6 to 10 percent slopes	1,510	435	0	1,945	.3
Orangeburg loamy sand, 2 to 6 percent slopes	3,700	2,565	0	6,265	1.0
Orangeburg loamy sand, 6 to 10 percent slopes	2,000	1,855	0	3,855	.6
Orangeburg loamy sand, 10 to 20 percent slopes	1,580	555	0	2,135	.3
Pacolet sandy loam, 10 to 25 percent slopes	2,375	640	2,255	5,270	.8
Red Bay loamy sand, 2 to 6 percent slopes	3,380	1,535	0	4,915	.8
Red Bay sandy loam, 6 to 10 percent slopes, eroded	550	755	0	1,305	.2
Starr and Toccoa soils	785	865	800	2,450	.4
Susquehanna fine sandy loam, 5 to 15 percent slopes	385	2,850	0	3,235	.5
Vance sandy loam, 2 to 6 percent slopes, eroded	2,710	3,090	5,840	11,640	1.8
Vance sandy loam, 6 to 10 percent slopes, eroded	970	3,525	3,900	8,395	1.3
Vance sandy loam, 10 to 25 percent slopes, eroded	3,055	8,200	3,230	14,485	2.2
Vance sandy clay loam, 2 to 10 percent slopes, eroded	3,560	9,230	4,150	16,940	2.6
Vaucluse loamy sand, 2 to 10 percent slopes	3,010	4,695	0	7,705	1.2
Wehadkee soils	4,740	4,000	1,310	10,050	1.5
Wilkes sandy loam, 2 to 10 percent slopes, eroded	855	2,770	1,820	5,445	.8
Wilkes soils, 10 to 25 percent slopes	9,155	20,755	15,465	45,375	7.0
Total land	162,944	257,152	217,216	637,312	97.9
Inland water	6,650	130	6,785	13,565	2.1
Total	169,594	257,282	224,001	650,877	100.0

formed in sandy and clayey materials of marine origin. They occur on interstream ridges and side slopes adjacent to drainageways, mainly in the southern parts of Baldwin and Jones Counties. Slopes range from 2 to 15 percent.

In a representative profile, the surface layer is dark grayish-brown loam 5 inches thick. The next layer is yellowish-brown loamy sand to a depth of 29 inches. The next 13 inches is yellowish-brown sandy clay loam. Below this layer, to a depth of 48 inches, is a firm, brittle, and slightly cemented fragipan that is yellowish-brown, mottled sandy clay loam. From a depth of 48 to 65 inches is strong-brown sandy clay loam mottled with shades of red and gray. This layer also is firm, cemented, and brittle. Depth to hard rock is generally more than 15 feet, and rock seldom crops out or is exposed in road cuts and excavations.

Ailey soils are low in natural fertility and organic-matter content and strongly acid throughout. Permeability is slow in the fragipan. The available water capacity is low. Tilth is good.

These soils are used to some extent for crops and respond moderately well to good management, although droughtiness is a problem. About half the acreage is in forest, chiefly loblolly and slash pines.

Representative profile of Ailey loamy sand, 2 to 6 percent slopes, 11 miles west of Milledgeville on State Highway No. 49, 2.3 miles south on Union Church Road, 0.2 mile east in pasture, Baldwin County:

Ap—0 to 5 inches, dark grayish-brown (10YR 4/2) loamy sand; weak, fine, granular structure; very friable; many fine roots; strongly acid; clear, smooth boundary.

A2—5 to 29 inches, yellowish-brown (10YR 5/6) loamy sand; weak, fine, granular structure; very friable; few rounded quartz pebbles; common fine roots; strongly acid; gradual, wavy boundary.

B2t—29 to 42 inches, yellowish-brown (10YR 5/6) sandy clay loam; weak, medium, subangular blocky structure; friable; few fine roots; strongly acid; abrupt, wavy boundary.

Bx1—42 to 48 inches, yellowish-brown (10YR 5/6), sandy clay loam; many, medium, prominent mottles of dark red (2.5YR 3/6) and common, medium, prominent mottles of light brownish gray (2.5Y 6/2); weak, coarse, prismatic and medium, angular blocky structure; firm, cemented, and brittle; few fine pores; strongly acid; clear, wavy boundary.

Bx2—48 to 65 inches, strong-brown (7.5YR 5/6) sandy clay loam; many, coarse, prominent mottles of red (2.5YR 4/6) and common, medium, prominent mottles of olive gray (5Y 5/2); the olive-gray material is sandy loam; weak, thick, platy structure; firm, compact, and brittle; common medium pores; strongly acid.

The Ap horizon, or Al horizon, when present, ranges from grayish brown to very dark gray; it is loamy sand, loamy coarse sand, sand, or coarse sand and is 5 to 9 inches thick. The A2 horizon is pale brown, light yellowish brown, or yellowish brown and is 17 to 31 inches thick. The Bt horizon is yellowish brown, yellowish red, or strong brown. Mottles of strong brown or yellowish red are in some profiles. The Bx horizon ranges in color from strong brown to yellowish brown and has common to many mottles in shades of gray, brown, and red. It is at a depth of 32 to 43 inches below the surface and extends to a depth of more than 60 inches.

Ailey soils occur with Vaucluse, Esto, Lakeland, and Norfolk soils. They have a sandy A horizon that is thicker than 20 inches, whereas this is lacking in Vaucluse soils. They have less clay in the B horizon than the Esto soils. Ailey soils have a fragipan and are not sandy to so great a depth as Lakeland soils. They have a thicker A horizon than Norfolk soils.

Ailey loamy sand, 2 to 6 percent slopes (AgB).—This soil is mostly in areas of about 10 to 60 acres along ridgetops. The profile is the one described as representative for the series.

Included with this soil in mapping are small areas of Vaucluse and Lakeland soils. Also included are small areas of a similar soil that is 5 to 10 percent plinthite.

This Ailey soil responds moderately well to good management, but because it is sandy to a depth of about 29 inches, it is droughty. A large acreage, formerly cultivated, is now in loblolly and slash pines. Capability unit IIIs-2; woodland suitability group 4s2.

Ailey loamy sand, 6 to 10 percent slopes (AgC).—This soil is mostly in areas 5 to 40 acres in size. Many of these areas are long and narrow and are adjacent to drainageways.

Included with this soil in mapping are small areas of Vaucluse and Lakeland soils. There are a few shallow gullies in some areas. Also included are a few areas of similar soils that are 5 to 10 percent plinthite in the subsoil.

This soil responds moderately well to good management, but it is droughty and seldom used for cultivated crops. A large acreage, formerly cultivated, is now in loblolly and slash pines. Capability unit IVs-2; woodland suitability group 4s2.

Ailey soils, 10 to 15 percent slopes (AhD).—This is an undifferentiated group of Ailey soils and other well-drained soils that are not classified. These soils are in areas of 5 to 50 acres along side slopes adjacent to drainageways.

The Ailey soils make up the dominant part of the unit and occur in each mapped area; the rest is included soils. The pattern and proportion of soils are not uniform from one area to another. It was not feasible to map each soil separately, because slope limits use and management of all the soils in about the same way.

Soils of this group have a brownish, sandy or loamy surface layer and a yellowish, clayey or loamy subsoil. The Ailey soils have a profile similar to the one described as representative for the series, but the surface layer ranges from loamy sand to sand or coarse sand (fig. 3).

These soils are seldom used for crops and pasture, and they are mostly wooded. Capability unit VIIe-3; woodland suitability group 4s2.

Ailey and Norfolk loamy sands, 2 to 10 percent slopes (AAC).—This undifferentiated group consists chiefly of well-drained Ailey and Norfolk soils on relatively short side slopes of uplands. These soils occur in areas about 5 to 30 acres in size. The areas are about 43 percent Ailey soils and 35 percent Norfolk soils; the rest is mainly similar soils. It was not feasible to map each soil separately, because all the soils have similar limitations to use and management.

The Ailey soils and the Norfolk soils have a profile similar to the one described as representative for their respective series, but the surface layer of the

Figure 3.—This road cut exposes deep strata of saprolite that underlies the Ailey soils in some places.

Ailey soils ranges from loamy sand to loamy coarse sand.

Included with this group in mapping are areas of Lakeland, Susquehanna, and other soils.

Soils of this mapping unit are used for crops and pasture to a limited extent. Mostly, however, they are wooded and are suited to this use. The Ailey soils are droughty, but the Norfolk soils have moderate available water capacity. Capability unit IVs-2; woodland suitability group 4s2.

Buncombe Series

The Buncombe series consists of excessively drained, sandy soils adjacent to some of the larger streams. These soils formed in alluvium deposited by streams at flood stage. They occur chiefly along the rivers and in smaller areas scattered along lesser streams. Slopes range from 0 to 4 percent.

In a representative profile, the surface layer is reddish-brown loamy sand about 6 inches thick. The underlying layer, extending to a depth of 42 inches, is brown and dark yellowish-brown loamy sand. The lower layer, extending to a depth of 60 inches, is yellowish-red sandy loam. Depth to hard rock is generally more than 10 feet.

Buncombe soils are very low in natural fertility and are very strongly acid in all layers. They are very low in organic-matter content. Available water capacity is low, and permeability is rapid. Tilth is good.

These soils are used to some extent for crops and pasture, but droughtiness is a problem in the growing season and the soils are flooded in winter and spring. In wooded areas, sycamore, beech, willow, loblolly pine, and water oak are the chief trees.

Representative profile of Buncombe loamy sand, 4 miles south of Milledgeville on State Highway No. 112, one-half mile east on secondary road on west side of the Oconee River, Baldwin County:

Ap—0 to 6 inches, reddish-brown (5YR 4/4) loamy sand; weak, fine, granular structure; loose; many fine roots; many very fine mica flakes; very strongly acid; abrupt, smooth boundary.

C1—6 to 16 inches, brown (7.5YR 4/4) loamy sand; single grained; very friable; many fine roots; many very fine mica flakes; very strongly acid; clear, smooth boundary.

C2—16 to 42 inches, dark yellowish-brown (10YR 4/4) loamy sand; single grained; very friable; many fine roots; many fine mica flakes; very strongly acid; clear, smooth boundary.

Ab—42 to 60 inches, yellowish-red (5YR 4/6) sandy loam; weak, fine, granular structure; very friable; many fine roots; many fine mica flakes; very strongly acid.

The Ap horizon ranges from very dark grayish brown to reddish brown. The C horizon ranges from very dark grayish brown to reddish yellow. It ranges from sand to loamy sand.

Buncombe soils occur with Congaree, Toccoa, Chewacla, and Starr soils. They are sandier throughout than the associated soils and better drained than Chewacla soils.

Buncombe loamy sand (Bfs).—This soil is generally in long, narrow areas of 2 to 15 acres that are adjacent to rivers and larger streams. It formed in material deposited by these streams at flood stage. Slopes range from 0 to about 4 percent.

Included with this soil in mapping are small areas of similar soils that have one or more layers in shades of red, and small areas of Chewacla and Congaree soils. Also included are areas of similar soils that have a surface layer of sandy loam or fine sandy loam.

This soil is seldom used for crops because of droughtiness. Most of the acreage is either in pasture or woods. Capability unit IIIs-1; woodland suitability group 2s8.

Cecil series

The Cecil series consists of well-drained soils that formed in material weathered from gneiss and granite. These soils are on broad to narrow ridgetops and fairly long hillsides throughout the survey area. Slopes range from 2 to 25 percent.

In a representative profile, the surface layer is reddish-brown sandy loam 8 inches thick. Below this is a layer of yellowish-red sandy clay loam 4 inches thick. The next layer is 48 inches thick. In sequence from the top, the upper 4 inches of this layer is red clay loam, the next 28 inches is red clay, and the lower 16 inches is red clay loam. The underlying material is saprolite. Depth to hard rock is generally more than 15 feet.

Cecil soils are low in natural fertility and are strongly acid throughout. They are low in organic-matter content. Available water capacity is medium, and permeability is moderate. Tilth is good except in severely eroded areas.

These soils mostly were cultivated in the past, but now about three-fourths of the acreage is in pine woodland. The rest is cultivated or pastured. The original vegetation was chiefly white oak, post oak, red oak, blackjack oak, hickory, some dogwood, sweetgum, yellow-poplar, and pines.

Representative profile of Cecil sandy loam, 2 to 6 percent slopes, eroded, 6.5 miles east of Gray railroad crossing on State Highway No. 22, 2.4 miles north and 3.8 miles east on paved county road, in woods, Jones County:

Ap—0 to 8 inches, reddish-brown (5YR 5/4) sandy loam; weak, fine, granular structure; very friable; many fine

roots; few coarse sand grains and small angular pebbles; strongly acid; abrupt, smooth boundary.

B1—8 to 12 inches, yellowish-red (5YR 5/6) sandy clay loam; weak, medium and fine, granular structure; friable; many fine roots; many coarse sand grains and angular pebbles; strongly acid; clear, smooth boundary.

B21t—12 to 16 inches, red (2.5YR 4/8) clay loam; moderate, fine and medium, subangular blocky structure; friable; patchy clay films on ped surfaces and in root channels; few fine mica flakes; strongly acid; gradual, wavy boundary.

B22t—16 to 26 inches, red (10R 4/6) clay; moderate, medium, subangular blocky structure; firm; patchy clay films on ped surfaces and in root channels; few fine mica flakes; strongly acid; gradual, wavy boundary.

B23t—26 to 44 inches, red (10R 4/8) clay; moderate, medium, subangular blocky structure; firm; common fine mica flakes; patchy clay films on few ped surfaces and in root channels; few fine mica flakes; strongly acid; gradual, wavy boundary.

B24t—44 to 56 inches, red (10R 4/8) clay loam; moderate, medium, subangular and angular blocky structure; friable; common fine mica flakes; patchy clay films on ped surfaces; strongly acid; gradual, wavy boundary.

B3t—56 to 60 inches, red (10R 4/6) clay loam; moderate, medium, subangular blocky structure; friable; clay films on some ped surfaces; pockets of sandy material; common fine mica flakes; strongly acid; gradual, wavy boundary.

C—60 to 84 inches, red (2.5YR 4/8) saprolite that crushes to sandy clay loam; few clay films in cracks and seams; few feldspar crystals and coarse sand grains.

The solum ranges from 40 to 64 inches in thickness.

The Ap horizon ranges from dark grayish brown to red and reddish brown in color and from sandy loam to cobbly sandy loam and sandy clay loam in texture. It is 4 to 9 inches thick. The A2 horizon, where present, is brown, strong brown, or reddish brown and is 3 to 8 inches thick. The B1 horizon, where present, is yellowish red or red; it is sandy clay loam or clay loam and is 4 to 8 inches thick. The B2t horizon is 24 to 44 inches thick and is clay or clay loam. The B3t horizon is red or red mottled with strong brown, is clay loam or sandy clay loam, and is 4 to 20 inches thick.

Cecil soils commonly occur with Davidson, Vance, and Pacolet soils. They are less red in the B horizon and have a thinner solum than Davidson soils. They are redder and more friable in the B horizon and have a thicker solum than Vance soils. They are similar in color but have a thicker solum than Pacolet soils.

Cecil cobbly sandy loam, 2 to 10 percent slopes (CAC).—This soil is in areas of 5 to 40 acres on broad, gently sloping ridgetops and moderately long, sloping hillsides. The profile of this soil is similar to the one described as representative for the series, but the surface layer is cobbly and gravelly and is 4 to 7 inches thick.

Included with this soil in mapping are some severely eroded areas. In these areas, the surface layer is reddish-brown to yellowish-red cobbly sandy clay loam. Also included are small areas of similar soils that have a dark-red subsoil.

The cobblestones and gravel on the surface of this soil limit its use. The hazard of erosion is slight to moderate. About 80 percent of the acreage is wooded and 15 percent is in pasture. A small acreage is cultivated, and a small acreage is idle. Capability unit IVs-1; woodland suitability group 3x7.

Cecil sandy loam, 2 to 6 percent slopes, eroded (CyB2).—This soil is in areas of 5 to 50 acres on very gently sloping, broad interstream ridges. The profile of this soil is the one described as representative of the series. The present surface layer consists of material from the upper part of the subsoil that has been mixed with material from the original surface layer during tillage. There are a few shallow gullies.

Included with this soil in mapping are small areas that have gravel on the surface and areas that have a surface layer of coarse sandy loam and fine sandy loam. Also included are small areas of Vance and Pacolet soils, some small severely eroded areas, and some areas that are only slightly eroded.

This soil is well suited to many kinds of crops and can be cultivated if it is well managed. Because of slope, erosion is a hazard. Most of the acreage was cultivated at some time, but now about half of it is in forest. Capability unit IIe-1; woodland suitability group 3o7.

Cecil sandy loam, 6 to 10 percent slopes, eroded (CyC2).—This soil is well drained and is in areas of 5 to 30 acres. It has long slopes and is adjacent to drainageways. This soil is similar to the one described as representative for the series, but it is slightly shallower. Clayey material from the subsoil has been mixed by tillage with the original surface layer. There are a few shallow to deep gullies.

Included with this soil in mapping are a few severely eroded areas where the surface layer is yellowish-red or red sandy clay loam or clay loam. Also included are small areas of Vance and Pacolet soils.

This soil is suited to many kinds of crops, but because of medium to rapid runoff, the hazard of erosion is moderate to severe. This soil responds well to fertilization and liming. Practically all of it was cultivated in the past, but now the soil is used mostly for pasture. About 25 percent is cultivated, and the rest is idle or forested. Capability unit IIIe-1; woodland suitability group 3o7.

Cecil sandy loam, 10 to 25 percent slopes, eroded (CyE2).—This soil is well drained and is in long, narrow areas 10 to 50 acres in size. The present plow layer consists of material from the subsoil that has been mixed with the original surface layer through tillage.

Included with this soil in mapping are some severely eroded areas where the surface layer is sandy clay loam. There are a few shallow gullies and some that are 3 to 6 feet deep. Also included are small areas of Pacolet soils and a few small areas that have never been cultivated and where the original surface layer is mostly still in place. There is an occasional rock outcrop, and in places a few boulders are on the surface.

Because runoff is very rapid and the hazard of erosion is severe, this soil is unsuited to crops. It was mostly cultivated at some time in the past, but now about 90 percent of the acreage is in forest and the rest is pastured. Capability unit VIe-1; woodland suitability group 3r8.

Cecil sandy clay loam, 2 to 6 percent slopes, eroded (CZB2).—This soil is in areas of 5 to 10 acres on broad ridgetops. The profile of this soil is similar to the one described as representative for the series, but the plow layer consists largely of material from the subsoil. It is red to strong-brown sandy clay

loam. Shallow gullies and galled spots are common, and a few gullies 2 to 5 feet deep have been cut.

Included with this soil in mapping are small areas that are less eroded and have a surface layer of sandy loam. Also included are small areas of Vance and Pacolet soils.

The hazard of erosion is moderate to severe if this soil is cultivated and not protected. This soil is suited to many kinds of crops. All of the acreage was cultivated in the past, but now some of it has reverted to loblolly and shortleaf pines and about 50 percent is cultivated or pastured. Capability unit IIIe-1; woodland suitability group 4c2e.

Cecil sandy clay loam, 6 to 10 percent slopes, eroded (CZC2).—This soil is on long, narrow ridgetops and moderately long hillsides. The present plow layer is sandy clay loam that consists largely of subsoil material. Otherwise, the profile is similar to the one described as representative of the series. Shallow gullies are common, and a few deep gullies have been cut into the friable underlying material.

Included with this soil in mapping are a few areas of soils that have a surface layer of sandy loam or gravelly clay loam. Also included are small areas of Pacolet and Vance soils.

Tilth is generally poor, and the plow layer tends to be cloddy if the soil is cultivated when dry or too wet. Because runoff is rapid and the hazard of erosion is severe in cultivated fields, the use of this soil for crops is limited. All of the acreage was cultivated at some time in the past, but now about 60 percent of it has reverted to shortleaf and loblolly pines; the rest is cultivated, pastured, or idle. Capability unit IVe-1; woodland suitability group 4c2e.

Cecil sandy clay loam, 10 to 25 percent slopes, eroded (CZE2).—This soil is generally on side slopes next to the stream bottoms. The surface layer is yellowish-red to reddish-brown sandy clay loam. Practically all of the original surface layer and some of the subsoil have been removed by erosion. The present surface layer consists mostly of subsoil material. Shallow gullies are common, and there are a few deep gullies.

Included with this soil in mapping are a few small areas where the slope ranges to 35 percent. A few places still have a thin surface layer of sandy loam between gullies. Mica flakes and schist fragments are common in a few areas.

This soil is not suited to cultivation, because of the erosion hazard. The acreage is large, and practically all of it was cultivated at some time in the past, but now all has reverted to woodland. Capability unit VIe-1; woodland suitability group 4c3e.

Chewacla Series

The Chewacla series consists of somewhat poorly drained soils that formed in alluvium. These soils are mostly on the broad flood plains along the rivers and some of the other larger streams in Baldwin, Jones, and Putnam Counties. Slopes range from 0 to 2 percent.

In a representative profile, the surface layer is reddish-brown silt loam 7 inches thick. Below this is a layer of brown clay loam 10 inches thick. The next layer is dark-brown silty clay loam, about 21 inches thick, that has brownish-gray mottles. It is underlain by light brownish-gray silty clay loam that has yellowish-brown mottles. Depth to hard rock is generally more than 10 feet.

Chewacla soils are moderate in natural fertility. Organic-matter content is medium, and reaction is medium acid to strongly acid throughout. Permeability is moderate, and available water capacity is high. Tilth is generally good. The seasonal high water table is within 21 to 24 inches of the surface for several months each year.

About three-fourths of the acreage is in pasture or trees, and the rest is cultivated or idle. The wooded areas are in sweetgum, beech, water oaks, alders, and other water-tolerant trees.

In this survey area, the Chewacla soils are mapped only in an undifferentiated group with the Starr soils.

Representative profile of Chewacla silt loam in an area of Chewacla and Starr soils, in an idle field 2.2 miles southeast of Milledgeville on the west side of Oconee River, Baldwin County:

Ap—0 to 7 inches, reddish-brown (5YR 4/4) silt loam; weak, fine, granular structure; friable; many small roots; many fine mica flakes; medium acid; abrupt, smooth boundary.

B1—7 to 17 inches, brown (10YR 4/3) clay loam; common, fine, distinct mottles of light yellowish brown (10YR 6/4); weak, medium, subangular blocky structure; friable; many fine mica flakes; medium acid; clear, wavy boundary.

B2—17 to 38 inches, dark-brown (10YR 3/3) silty clay loam; common, fine, distinct mottles of light brownish gray (10YR 6/2); weak, medium, subangular blocky structure; friable; many fine mica flakes; medium acid; clear, wavy boundary.

B2g—38 to 52 inches, light brownish-gray (10YR 6/2) silty clay loam; common, fine, distinct mottles of yellowish brown (10YR 5/8); weak, medium, subangular blocky structure; friable; many fine mica flakes; common, small, soft, black bodies; medium acid.

The Ap and A1 horizons range from very dark grayish brown to dark brown and reddish brown; they are sandy loam, loam, silt loam, and silty clay loam and are 4 to 10 inches thick. The B2 horizon ranges from dark brown to reddish brown. The B2g horizon ranges from light brownish gray to gray. Mottles that have chroma of 2 or less are within 20 inches of the surface. Depth to mottles ranges from 4 to 20 inches. The C horizon, if present, ranges from loamy sand to silty clay.

Chewacla soils occur with Congaree, Wehadkee, Starr, and Toccoa soils. They are more poorly drained than Congaree, Starr, and Toccoa soils, and they have gray colors that are lacking in all of those soils. Chewacla soils are better drained than Wehadkee soils.

Chewacla and Starr soils (Cst).—This undifferentiated group consists chiefly of Chewacla soils and Starr soils. These soils are in areas of 10 to 500 acres on bottom lands along the major streams. Slopes range from 0 to 2 percent. The pattern and proportion of soils are not uniform from one area to another, but each area mapped of this unit generally contains Chewacla and Starr soils. The Chewacla soils make up about 60 percent of the total acreage, the Starr soils about 18 percent, and somewhat similar soils the remaining 22 percent.

The Chewacla and Starr soils have the profiles described as representative for their respective series, but the surface layer of Chewacla soils is sandy

loam to silty clay loam and that of Starr soils is sandy loam, fine sandy loam, and silt loam.

Included with these soils in mapping are small areas of Congaree and Wehadkee soils. Also included are areas of soils that are similar to Chewacla soils but have a subsoil of silty clay or sandy clay.

Soils of this mapping unit are commonly used for pasture, corn, and hay. About half the acreage is in trees. These soils respond well to good management and are suited to most crops grown on bottom lands. Capability unit IIIw-1; woodland suitability group 1w8.

Congaree Series

The Congaree series consists of well-drained loamy soils that formed in recent alluvium on flood plains of the larger streams in the survey area. Slopes range from 0 to 2 percent.

In a representative profile, the upper 6 inches of the surface layer is brown fine sandy loam and the lower part is reddish-brown loam 12 inches thick. Beneath this is a layer of strong-brown loamy coarse sand 5 inches thick. The next layer is yellowish-red loam 9 inches thick. Between depths of 32 and 65 inches is brown or reddish-brown loam, fine sandy loam, or loamy sand. Depth to hard rock is generally more than 10 feet.

Congaree soils are moderate in natural fertility and low in organic-matter content. They are strongly acid or medium acid in the upper part, medium acid in the middle, and strongly acid in the lower part. Available water capacity is medium, and permeability is moderate. A seasonal high water table is at depths of about 36 to 40 inches for short periods in winter and spring. Tilth is good.

These soils are well suited to crops, but the lack of farm labor and the flood hazard have caused most of the acreage to be used for woodland and pasture. The original vegetation was chiefly water oak, sweetgum, yellow-poplar, sycamore, hickory, beech, elm, and alder.

In this survey area, the Congaree soils are mapped only in an undifferentiated group with the Toccoa soils.

Representative profile of Congaree fine sandy loam in an area of Congaree and Toccoa soils, 3.3 miles west of Post Office on State Highway No. 22, 1.4 miles south on dirt road, 0.6 mile on field road in pasture, south side of Fishing Creek, Baldwin County:

Ap—0 to 6 inches, brown (7.5YR 4/4) fine sandy loam; weak, fine, granular structure; very friable; many mica flakes; many fine roots; strongly acid; abrupt, smooth boundary.

A1—6 to 18 inches, reddish-brown (5YR 4/4) loam; weak, fine, granular structure; very friable; few fine roots; many fine mica flakes; medium acid; clear, smooth boundary.

C1—18 to 23 inches, strong-brown (7.5YR 5/6) loamy coarse sand; single grained; loose; few peds of reddish-brown loam; common mica flakes; medium acid; clear, wavy boundary.

C2—23 to 32 inches, yellowish-red (5YR 4/8) loam; single grained; very friable; medium acid; gradual, smooth boundary.

C3—32 to 39 inches, brown (7.5YR 5/4) loam; massive; friable; medium acid; clear, wavy boundary.

C4—39 to 44 inches, reddish-brown (5YR 5/4) fine sandy loam; massive; very friable; common black concretions; medium acid; clear, wavy boundary.

C5—44 to 65 inches, reddish-brown (5YR 4/4) loamy sand; single grained; loose; few quartz pebbles; few balls of clay; strongly acid.

The A horizon ranges from dark reddish brown to dark brown and brown to yellowish-brown in color, from sandy loam to silt loam in texture, and from 6 to 18 inches in thickness. The C horizon is at a depth between 10 and 30 inches and is brown, strong brown, reddish brown, or yellowish red. This horizon is stratified, and it is sandy loam, loam, silt loam, silty clay loam, and clay loam. The content of clay between depths of 10 and 40 inches is about 20 and 30 percent. In most places the profile contains very fine mica flakes, but the amount is variable. Depth to gray mottles ranges from 40 to more than 60 inches.

The Congaree soils occur mainly with Chewacla, Buncombe, Toccoa, and Wehadkee soils. They are better drained than Chewacla and Wehadkee soils. They are not so sandy as the Buncombe and Toccoa soils.

Congaree and Toccoa soils (Cot).—This undifferentiated group consists chiefly of Congaree and Toccoa soils. These soils are in areas of 6 to 50 acres on nearly level flood plains of the larger streams. The pattern and proportion of soils are not uniform from one area to another, but most mapped areas contain both Congaree and Toccoa soils. Congaree soils make up about 40 percent of the total acreage, Toccoa soils about 20 percent, Buncombe and Starr soils about 15 percent each, and similar soils the remaining 10 percent.

The Congaree and Toccoa soils have the profiles described as representative for their respective series, but the surface layer of Congaree soils is sandy loam to silt loam and the surface layer of Toccoa soils is sand to sandy loam.

Included with these soils in mapping are small areas of Chewacla and Wehadkee soils.

Soils of this mapping unit are suitable for farming and are used for most crops and pasture plants, but flooding in winter and spring somewhat limits use of the soils during these seasons. Fields are commonly well shaped and large enough to permit the use of multirow farm machinery. Capability unit IIw-1; woodland suitability group 1o7.

Davidson Series

The Davidson series consists of well-drained soils that formed in residual material weathered chiefly from dark-colored basic rocks. These soils are on interstream ridgetops and on narrow and steeper slopes adjacent to drainageways. Slopes range from 2 to 25 percent.

In a representative profile, the surface layer is dark reddish-brown loam 7 inches thick. The next layer is dark-red clay loam 5 inches thick. This is underlain by dark-red clay that extends to a depth of 72 inches. Depth to hard rock is generally more than 20 feet.

Davidson soils are low to moderate in natural fertility and are strongly acid in the upper part and medium acid in the lower part. They are low in organic-matter content. Available water capacity is medium, and permeability is moderate. Tilth is good

where the moisture content is favorable and the soils are not severely eroded.

Davidson soils on the smoother landscapes are generally well suited to farming. Most of the acreage was cultivated at one time, but now about 80 percent of it is in pine forest. The native vegetation is chiefly white oak, post oak, red oak, hickory, sassafras, dogwood, maple, shortleaf pine, and loblolly pine.

Representative profile of Davidson loam, 2 to 6 percent slopes, eroded, 3.7 miles north of Gray, 0.3 mile east of Bradley on paved county road, 0.5 mile south on dirt road, then 0.9 mile north on farm road in forest, Jones County:

Ap—0 to 7 inches, dark reddish-brown (5YR 3/3) loam; weak, fine, granular structure; friable, many fine roots; strongly acid; abrupt, smooth boundary.

B1t—7 to 12 inches, dark-red (2.5YR 3/6) clay loam; weak, fine and medium, subangular blocky structure; friable, patchy clay films on ped surfaces; few black concretions; strongly acid; gradual, wavy boundary.

B21t—12 to 23 inches, dark-red (10R 3/6) clay; moderate, medium, subangular blocky structure; friable to firm; few, small, black concretions; discontinuous clay films on ped surfaces; strongly acid; gradual, wavy boundary.

B22t—23 to 44 inches, dark-red (10R 3/6) clay; moderate, medium, subangular blocky structure; friable; few black concretions; continuous clay films on ped surfaces; few ¼-inch quartz pebbles; medium acid; gradual, wavy boundary.

B23t—44 to 53 inches, dark-red (2.5YR 3/6) clay; moderate, medium, subangular blocky structure; friable, few black concretions; patchy clay films on ped surfaces; few, coarse sand grains; medium acid; gradual, wavy boundary.

B24t—53 to 72 inches, dark-red (2.5YR 3/6) clay; few, medium, distinct, yellowish-brown (10YR 5/6) mottles; moderate, medium, subangular and angular blocky structure; friable; continuous clay films on ped surfaces; coarse sand grains; medium acid.

The Ap horizon ranges from 5 to 8 inches in thickness and from dark reddish brown to dusky red in color. Its texture is loam or clay loam. The B1t horizon is not present in some places. A red to dark-red B3 horizon is in some places. The solum is typically more than 6 feet thick. Depth to hard rock, as observed in road cuts and gullies, typically exceeds 20 feet and ranges to 60 feet. In the B horizon, mica flakes range from none to common.

Davidson soils occur with Cecil, Wilkes, Enon, and Gwinnett soils. They are thicker and redder in the A and B horizons than Cecil soils. They have a thick, dark-red B horizon, whereas Wilkes soils have a thin, light olive-brown B horizon, and Enon soils have a thinner, yellowish-brown and mottled B horizon. The solum of Davidson soils is thicker than that of Gwinnett soils.

Davidson loam, 2 to 6 percent slopes, eroded (DgB2).—This soil is in areas of 15 to 300 acres on broad ridgetops. The profile is the one described as representative for the series. The present surface layer consists of material from the original surface layer and the upper part of the subsoil that has been mixed by plowing.

Included with this soil in mapping are small, severely eroded areas. These areas contain shallow gullies and a few deep ones that have been cut into the dark-red, clayey subsoil. Here, very little of the original surface layer remains. Also included are small areas of Cecil and Gwinnett soils.

The hazard of further erosion is moderate if this soil is cultivated. If the soil is well managed, however, it is suited to many kinds of crops. All of the acreage was cultivated in the past, but about three-fourths of it has reverted to loblolly and shortleaf pines. Capability unit IIe-1; woodland suitability group 3o7.

Davidson loam, 6 to 10 percent slopes, eroded (DgC2).—This soil is in areas of 5 to 40 acres on long hillsides adjacent to ridgetops. The profile of this soil is similar to that described as representative for the series, but the surface layer is dark reddish-brown to dusky-red loam 3 to 4 inches thick. The present surface layer consists of material from the upper part of the subsoil that has been mixed with remnants of the original surface layer by plowing.

Included with this soil in mapping are small, severely eroded areas. These areas contain shallow gullies and a few deep ones that have been cut into the dark-red, clayey subsoil. Also included are small areas of Cecil and Gwinnett soils.

Runoff is moderately rapid on this soil, and the hazard of further erosion is severe. This soil is well suited to pasture, crops, and trees. All of the acreage was cultivated in the past, but about two-thirds of it has reverted to trees. Capability unit IIIe-1; woodland suitability group 3o7.

Davidson clay loam, 6 to 10 percent slopes, eroded (DhC2).—This soil is in areas of 10 to 90 acres on rounded ridgetops and hillsides adjacent to streams. It has a plow layer of dusky-red clay that is chiefly subsoil material. Erosion has removed all or nearly all of the original surface layer. Beneath the plow layer, and reaching to a depth of about 60 inches, is dark-red clay. Some shallow and deep gullies are present.

Included with this soil in mapping are some very severely eroded areas that have a surface layer of clay.

Because of slope and poor tilth, this soil has moderately rapid runoff. The hazard of erosion is severe unless the surface is protected. This soil is difficult to cultivate except at optimum moisture content. The plow layer tends to clod when dry or is sticky when wet.

In places this soil is used for a moderately wide range of crops, but most of the acreage is in pasture or trees. All of the acreage was cultivated in the past, but about three-fourths of it has reverted to loblolly and shortleaf pines. Capability unit IVe-1; woodland suitability group 4c2e.

Davidson clay loam, 10 to 25 percent slopes, eroded (DhE2).—This soil of the uplands has a surface layer of dusky-red to dark reddish-brown clay loam that is largely subsoil material. Areas are 5 to 40 acres in size. Erosion has removed nearly all of the original surface layer. Beneath the present surface layer is dark-red clay several feet thick.

Included with this soil in mapping are some severely eroded areas that have a surface layer of clay. In places, rounded basic stones are on the surface. Some shallow and deep gullies are present. Also included are a few areas that have a thin surface layer of loam and areas where slopes are 25 to 40 percent.

Runoff is rapid on this soil, and the hazard of erosion is severe.

This soil responds well to good management, in

cluding use of fertilizer, and is well suited to pasture. About 60 percent of the acreage is in forest. Capability unit VIe-1; woodland suitability group 4c3e.

Davidson-Urban land complex, 2 to 10 percent slopes (DyC).—This mapping unit is in large areas of urban growth where the landscape is fairly smooth. Davidson soils make up 50 to 60 percent of the complex, and Urban land about 30 to 40 percent. The rest is Cecil, Enon, and Wilkes soils. The proportion of the major components is fairly consistent from one mapped area to another.

In most places the original soil profiles have been severely modified by cutting, filling, and shaping to accommodate community development. A few steep banks are severely eroded, and sediments are clogging streams. In some places, however, between structures and modified areas, remnants of the original soils are undisturbed; most of these are in grass or trees.

In areas where the Davidson soils have not been greatly altered, they have a profile similar to that described as representative for the series. Urban land consists mainly of residential houses, industrial buildings, schools, parking lots, streets, and other structures that normally accompany community development.

The use of this complex is likely to remain about the same for years to come. Lawns, gardens, small orchards, and pasture are the probable uses of soils not covered by structures. Capability unit and woodland suitability group not assigned.

Enon Series

The Enon series consists of well-drained soils that formed in clayey residuum weathered from such rocks as diorite, gabbro, hornblende gneiss, and schist. These soils are on uplands and widely scattered on low interstream ridges and slopes adjacent to drainageways. Slopes range from 2 to 12 percent.

In a representative profile, the surface layer is dark grayish-brown sandy loam 4 inches thick. The next layer is 27 inches thick. The upper 12 inches of this layer is yellowish-brown clay, the next 13 inches is yellowish-brown clay mottled with shades of brown and red, and the lower 2 inches is grayish-brown clay mottled with red and yellowish brown. The underlying material, to a depth of 60 inches, is strong-brown, light-gray, and red, highly weathered rock. Depth to hard rock generally is more than 10 feet.

Enon soils are low in natural fertility and organic matter content. They are slightly acid in the upper part and neutral in the lower part. Available water capacity is medium, and permeability is slow. Tilth is fair, but the subsoil is plastic when wet.

These soils are fairly well suited to most locally grown crops but are used more extensively for pasture. Under good management, they produce good grazing. A considerable acreage is in pine forest. The native vegetation consists mainly of mixed stands of hardwoods.

Representative profile of Enon sandy loam in an area of Enon soils, 6 to 10 percent slopes, eroded, 9 miles north of Milledgeville Post Office on State Highway No. 212, 1.5 miles west on Nelson Road, in pasture on north side of road, Baldwin County:

Ap—0 to 4 inches, dark grayish-brown (10YR 4/2) sandy loam; weak, fine, granular structure; very friable, few small manganese concretions and mica flakes; many small roots; slightly acid; abrupt, smooth boundary.

B21t—4 to 16 inches, yellowish-brown (10YR 5/8) clay; common, fine, prominent mottles of red and strong brown; strong, coarse, angular blocky structure; firm; clay films between and on surfaces of peds; few small manganese concretions; many small roots; many cracks filled with soil material from Ap horizon; slightly acid; gradual, wavy boundary.

B22t—16 to 29 inches, yellowish-brown (10YR 5/8) clay; common, fine, prominent mottles of red and strong brown and few, medium, distinct mottles of light brownish gray (2.5Y 6/2); moderate, medium, angular blocky structure; firm; continuous clay films on surfaces of peds and in root channels; few fine mica flakes; dark grayish-brown sandy loam in root holes; slightly acid; clear, wavy boundary.

B3t—29 to 31 inches, grayish-brown (2.5Y 5/2) clay; many, fine, prominent mottles of red and yellowish brown; moderate, medium, angular blocky structure; firm; continuous clay films on surfaces of peds; few small quartz fragments; few black concretions and fine mica flakes; neutral; clear, wavy boundary.

C—31 to 60 inches, streaked, layered, and mottled strong-brown, partly weathered, basic rock material; light-gray (10YR 7/1) and red (2.5YR 4/6) saprolite.

The solum ranges from 28 to 40 inches in thickness. Mica and manganese concretions range from none to common in all horizons. The A horizon is dark grayish brown, brown, or strong brown; it is sandy loam to sandy clay loam and is 4 to 7 inches thick. The B1 horizon, where present, is yellowish brown, brown, or strong brown; it is clay loam or sandy clay loam. Matrix colors of the B21t and B22t horizons are the same as those of the B1 horizon, but the B21t horizon has common yellowish-red and red mottles and the B22t horizon has common to many mottles in shades of red, brown, and gray. The gray mottles in the B22t horizon appear to be kaolin or feldspar and not mottles caused by wetness. The combined thickness of the B2t horizons is about 14 to 33 inches. The B3 horizon ranges from grayish brown to strong brown in color and has common to many mottles in shades of red, brown, and gray. It has few to common pebbles and fragments of soft, weathered rock.

Enon soils occur with Helena, Iredell, Vance, and Wilkes soils. They are better drained and less acid than the Helena soils. Enon soils are darker brown in the B horizon and less plastic than the Iredell soils. They are not so red in the B horizon as the Vance soils, and they have a thicker solum than the Wilkes soils.

Enon-Urban land complex, 5 to 12 percent slopes (EwD).—This mapping unit is mostly on gently sloping ridgetops and side slopes in small to fairly large bodies. The Enon soils make up about 35 to 50 percent of the total acreage, and Urban land about 25 to 35 percent. The rest is Wilkes, Pacolet, and Vance soils. The proportion of the major components is fairly consistent from one mapped area to another.

In places the original profiles have been severely modified by cutting, filling, and shaping to accommodate community development. A few steep banks are severely eroded, and sediments are clogging streams. In some places, however, between structures and modified areas, remnants of the original soils are undisturbed; most of these are wooded or in grass.

In areas where the Enon soils have not been

greatly altered, they have a profile similar to that described as representative for the series. Urban land consists mainly of areas that have residential houses, industrial buildings, schools, parking lots, streets, and other structures that normally accompany community development. Wilkes soils are shallow; Pacolet soils have a subsoil of red clay and clay loam 30 inches thick; and Vance soils have a yellowish-red subsoil 30 inches thick that is mottled with red, strong brown, and gray.

The use of this complex is likely to remain much the same for years to come; therefore, use for pasture, woodland, and crops is severely limited. Capability unit and woodland suitability group not assigned.

Enon soils, 2 to 6 percent slopes, eroded (EjB2).—This mapping unit is on fairly broad, low, interstream ridges in fields about 8 to 70 acres in size. It is about 70 percent Enon soils and 30 percent similar soils. The present surface layer ranges from sandy loam to sandy clay loam in texture and contains material from the upper part of the subsoil that has been mixed with the original surface layer by tillage. There are a few shallow or deep gullies.

Included with these soils in mapping are small areas of similar soils that have a red subsoil and areas that have a combined surface layer and subsoil more than 42 inches thick; in a few places the surface layer is severely eroded and is dark-brown sandy clay loam. Also included are a few small areas of Wilkes and Helena soils.

In this mapping unit there is a moderate hazard of erosion. Soils are used to a limited extent for most locally grown crops but more extensively for pasture and forest. Figure 4 shows an area of golf green on these soils. Capability unit IIe-3; woodland suitability group 4o1.

Enon soils, 6 to 10 percent slopes, eroded (EjC2) —This mapping unit is on side slopes adjacent to drainageways in areas 6 to 40 acres in size. The profile described as representative for the series is in this unit, but the present surface layer is sandy loam to sandy clay loam. In most places, tillage has mixed some of the upper part of the subsoil with the original surface layer. There are some shallow gullies and a few deep ones.

Figure 4.—An area of golf green on Enon soils, 2 to 6 percent slopes, eroded.

Included with this soil in mapping are small areas of similar soils that have a combined surface layer and subsoil more than 42 inches thick and a few, small, severely eroded areas. Also included are a few small areas of Wilkes and Helena soils.

Most of the acreage was used for crops at one time, but now most of it is used for pasture and forest, to which the soils are well suited. Capability unit IIIe-3; woodland suitability group 4o1.

Esto Series

The Esto series consists of well-drained soils that have a clayey subsoil. These soils formed in clayey deposits of old marine origin. They have mostly irregular and complex slopes and occur only in Baldwin and Jones Counties. Slopes range from 10 to 25 percent.

In a representative profile, the surface layer is dark grayish-brown loamy sand 3 inches thick. The subsurface layer is light yellowish-brown loamy sand 7 inches thick. The next layer is reddish-yellow sandy clay loam about 6 inches thick. Below this, to a depth of 72 inches, is a layer of sandy clay. The upper 20 inches is reddish-yellow, the middle 20 inches is reddish yellow mottled with shades of yellow and gray, and the lower part is mottled with yellowish brown, reddish yellow, strong brown, and light gray. Depth to hard rock is more than 10 feet.

Esto soils are low in natural fertility and organic-matter content. They are very strongly acid throughout. Permeability is slow, and available water capacity is medium. Tilth is generally good.

The Esto soils are seldom used for cultivated crops and are poorly suited to this use. They are sometimes used for pasture, but most of the acreage is in woodland. The native vegetation is mixed hardwoods and loblolly and slash pines and an understory of shrubs, vines, and grasses.

Representative profile of Esto loamy sand in an area of Esto soils, 10 to 25 percent slopes, 10 miles south of Gray on State Highway No. 18, 5.6 miles west on dirt road in mixed hardwood forest, Jones County:

Ap—0 to 3 inches, dark grayish-brown (10YR 4/2) loamy sand; weak, fine, granular structure; very friable; common fine roots and 10 percent small, rounded pebbles; very strongly acid; clear, smooth boundary.

A2—3 to 10 inches, light yellowish-brown (10YR 6/4) loamy sand; weak, fine, granular structure; very friable; common fine roots; 5 percent small, rounded pebbles; very strongly acid; clear, smooth boundary.

B1t—10 to 16 inches, reddish-yellow (7.5YR 6/8) sandy clay loam; moderate, medium, subangular blocky structure; friable; patchy clay films on ped surfaces; very strongly acid; gradual, wavy boundary.

B21t—16 to 36 inches, reddish-yellow (5YR 6/8) sandy clay; common, medium, distinct, yellowish-brown (10YR 5/8) mottles and few, medium, distinct, light-gray (10YR 7/2) mottles; moderate, coarse, angular blocky structure; firm; continuous clay films on ped surfaces; few medium roots; very strongly acid; gradual, wavy boundary.

B22t—36 to 56 inches, mottled reddish-yellow (5YR 6/6), yellowish-brown (10YR 5/2), and light-gray (10YR 7/1) sandy clay; strong, coarse, angular blocky structure; firm; continuous clay films on ped surfaces; very strongly acid; gradual, wavy boundary.

B23t—56 to 72 inches, mottled strong-brown (7.5YR 5/6), yellowish-brown (10YR 5/8), reddish-yellow (7.5YR 6/6), and gray (10YR 6/1) sandy clay; moderate, medium, subangular blocky structure; firm; patchy clay films on ped surfaces; very strongly acid.

The A1 horizon ranges from dark grayish brown to grayish brown and is 2 to 4 inches thick. The A2 horizon ranges from light brown to yellowish brown and is 6 to 7 inches thick. The B1 horizon is light yellowish brown to reddish yellow. The B2t horizon ranges from brownish yellow to reddish yellow and has mottles in shades of brown, yellow, red, and gray.

Esto soils occur with Ailey, Norfolk, and Orangeburg soils. They have a thinner A horizon and a more clayey B horizon than the Ailey soils. They have a redder and more clayey B horizon than Norfolk soils. Esto soils are less red in the B horizon than the Orangeburg soils.

Esto soils, 10 to 25 percent slopes (EgE).—This undifferentiated group consists of well-drained soils that have short, choppy, dissected slopes. These soils are in areas of about 10 to 80 acres in size.

The Esto soils, which are dominant, have the profile described as representative for the series. The other soils vary widely but have predominantly a clayey subsoil and a surface layer of loamy fine sand, loamy sand, loamy coarse sand, or sandy loam.

Included with these soils in mapping are some eroded areas where some of the subsoil has been mixed with the original surface layer.

These soils are seldom used for pasture or crops and are not suited to those uses. Most of the acreage is in forest, a good use. Capability unit VIIe-3; woodland suitability group 3o1.

Gwinnett Series

The Gwinnett series consists of well-drained soils that formed in residual material that weathered from rocks such as diorite and hornblende gneiss. These soils are on irregular landscapes. Slopes range from 15 to 35 percent.

In a representative profile, decomposing forest litter, about 2 inches thick, covers the mineral surface layer. The surface layer is dark reddish-brown loam 3 inches thick. The subsurface layer is dark reddish-brown clay loam about 3 inches thick. The next layer is dark-red clay 32 inches thick. The underlying material, at a depth of 38 inches, consists of partly weathered basic rock material. Depth to hard rock is generally more than 6 feet.

These soils are low in natural fertility and organic-matter content. They are strongly acid to medium acid throughout. Available water capacity is medium, and permeability is moderate. Tilth is good.

Much of the acreage was once cleared and, for short periods of time, used for crops. Currently, the vegetation is chiefly oaks, hickory, yellow-poplar, dogwood, shortleaf pine, and some loblolly pine.

Representative profile of Gwinnett loam, 15 to 35 percent slopes, eroded, in a wooded area 2 miles west of Milledgeville Post Office on State Highway No. 22, 5 miles northwest on State Highway No. 212, 0.7 mile east on dirt road, Baldwin County:

O1—2 inches to ½ inch, forest litter from hardwoods.

O2—½ inch to 0, decomposing forest litter mixed with dark reddish-brown (5YR 3/2) mineral matter.

A1—0 to 3 inches, dark reddish-brown (5YR 3/3) loam; moderate, fine, granular structure; very friable; strongly acid; clear, smooth boundary.

A3—3 to 6 inches, dark reddish-brown (5YR 3/3) clay loam; weak, medium, subangular blocky structure; friable; patchy clay films on ped surfaces; medium acid; clear, smooth boundary.

B21t—6 to 16 inches, dark-red (2.5YR 3/6) clay; moderate, medium, subangular blocky structure; friable; clay films on ped surfaces; few fine roots; common fine mica flakes; few coarse sand grains; medium acid; gradual, wavy boundary.

B22t—16 to 38 inches, dark-red (2.5YR 3/6) clay; moderate, medium, subangular blocky structure; friable; continuous clay films on ped surfaces; few fine roots; many fine mica flakes; medium acid; gradual, wavy boundary.

C—38 to 74 inches, highly weathered rock fragments in shades of red, yellow, brown, and gray; dark-red (2.5YR 3/6) clay loam in cracks and seams; medium acid.

R—74 inches, intermittent hard rock.

The solum ranges from 34 to 38 inches in thickness. The A1 or Ap horizon is 2 to 6 inches thick. The A3 horizon is lacking in some places, but where present, it is dark reddish-brown or dark-red sandy loam, loam, or clay loam. A B1t horizon of dark reddish-brown or dark-red clay to clay loam occurs in some profiles. The B2t horizon is 15 to 33 inches thick and is clay or clay loam.

Gwinnett soils occur with Davidson, Cecil, and Pacolet soils. They are similar in color but have a thinner solum than Davidson soils, which are more than 60 inches thick. They have redder A and B horizons than Cecil and Pacolet soils. Gwinnett soils are similar to the Pacolet soils in depth.

Gwinnett loam, 15 to 35 percent slopes, eroded (GgF2).—This soil is steep and well drained and occurs adjacent to drainageways in areas 8 to 60 acres in size. The profile is the one described as representative for the series. In most areas, tillage has mixed the upper part of the subsoil with remnants of the original surface layer. There are a few shallow gullies and a few deep ones.

Included with this soil in mapping are areas that have a surface layer of sandy loam and small areas of Davidson, Vance, and Wilkes soils.

The hazard of erosion is very severe if the surface is bare. Because this soil is steep, it is seldom cultivated and is not suited to this use. Most of the acreage is woodland, a good use. Capability unit VIIe-1; woodland suitability unit 3r8.

Helena Series

The Helena series consists of moderately well drained soils that formed in material weathered from gneiss and granite. These soils are on low ridges and the lower parts of side slopes. Slopes range from 2 to 10 percent.

In a representative profile, the surface layer is yellowish-brown sandy loam 3 inches thick. Below this is a layer of strong-brown clay, 9 inches thick, that is mottled with red. The next layer is yellowish-brown clay, 11 inches thick, that is mottled with shades of gray, brown, and white. The next layer, to a depth of 48 inches, is mottled light-gray, white, yellowish-brown, and strong-brown sandy clay. The

underlying material, extending to a depth of 60 inches, consists of gray, yellow, and brown material weathered from gneiss and apatitic granite. Depth to hard rock ranges from 4 to 15 feet.

These soils are low in natural fertility and organic-matter content. They are strongly acid throughout. Available water capacity is medium, and permeability is slow. A perched water table is at a depth of about 30 inches for short periods. Tilth is generally good except in areas that have a surface layer of sandy clay loam.

Most of the acreage was used for crops at some time in the past, but now about two-thirds of it is in loblolly pine and sweetgum. Locally grown crops respond well to good management on these soils. The native vegetation was blackjack oak, post oak, white oak, red oak, willow oak, hickory, and cedar.

Representative profile of Helena sandy loam, 2 to 6 percent slopes, eroded, 3.5 miles south of Gray on the east side of Comslo Road, Jones County:

Ap—0 to 3 inches, yellowish-brown (10YR 5/8) sandy loam; moderate, medium, granular structure; very friable; few ¼-inch quartz fragments; many fine roots; strongly acid; abrupt, smooth boundary.

B21t—3 to 12 inches, strong-brown (7.5YR 5/8) clay; many, fine, prominent mottles of red (2.5YR 5/8); moderate, medium and coarse, angular blocky structure; firm; clay films have a grayish sheen on ped surfaces and in old root channels; few fine roots; strongly acid; gradual, wavy boundary.

B22t—12 to 23 inches, yellowish-brown (10YR 5/8) clay; common, medium, prominent mottles of light gray (10YR 7/2), white (10YR 8/2), and strong brown (7.5YR 5/8); strong, coarse, angular blocky structure; firm; clay films have a grayish sheen on ped surfaces and in old root channels; few fine roots; few pockets of medium sand grains; strongly acid; gradual, wavy boundary.

B3t—23 to 48 inches, mottled light-gray (10YR 7/2), white (10YR 8/2), yellowish-brown (10YR 5/8), and strong-brown (7.5YR 5/8) sandy clay; moderate, medium, angular blocky structure; friable; clay films on ped surfaces; few pockets of medium sand grains; strongly acid.

C—48 to 60 inches, weathered rock that is mottled with shades of gray, yellow, and brown and crushes to loamy material; strongly acid.

The Ap horizon ranges from olive gray to brown in color and from sandy loam to sandy clay loam in texture. The B2t horizon ranges from yellow to strong brown and from sandy clay to clay. Red, brown, and gray mottles are throughout the B horizon. The solum commonly ranges from 28 to 40 inches in thickness but in places is 23 to 53 inches thick.

Helena soils occur with Vance, Enon, and Wilkes soils. They are similar to the Vance soils, which lack gray mottles in the upper 24 inches of the B horizon. Enon soils lack such mottles within the entire B horizon. Helena soils have a thicker B horizon than the Wilkes soils.

Helena sandy loam, 2 to 6 percent slopes, eroded (HYB2).—This soil is moderately well drained and occurs on low ridgetops and at the base of slopes in uplands. Areas are about 4 to 25 acres in size. The profile is the one described as representative for the series (fig. 5). In most places tillage has mixed some of the upper part of the subsoil with the original surface layer.

Included with this soil in mapping are small areas of a soil that is similar but uneroded and is dark grayish brown in the upper 4 inches of the surface layer. Also included are a few severely eroded areas that are cut by shallow gullies and by a few gullies 2 to 3 feet deep. Other inclusions are a few areas of a similar soil in Putnam County that has 20 to 36 inches of loamy sand over the subsoil.

Figure 5.—**A profile of Helena sandy loam, 2 to 6 percent slopes, eroded.**

The slow movement of water through this Helena soil results in excessive runoff, so that the hazard of erosion is moderate. This soil is used to a limited extent for most crops grown locally. Most of the acreage is in pasture and forest. Capability unit IIe-3; woodland suitability group 3w8.

Helena complex, 6 to 10 percent slopes, eroded (HOC2).—The soils in this mapping unit are moderately well drained and are on short side slopes adjacent to drainageways on uplands. They occur in areas about 3 to 7 acres in size. The soil that has the profile described as representative for the series is in this mapping unit. In about 40 percent of the profiles, the subsoil is distinctly mottled with gray below a depth of 16 inches because of the removal of soil material by erosion and because of the inherited characteristics of the underlying material. In most places tillage has mixed the upper part of the subsoil with the original surface layer.

Included with these soils in mapping are small areas of a similar, uneroded soil that has a grayish-brown surface layer. Also included are a few severely eroded areas that are cut by many shallow gullies and by a few gullies 3 to 5 feet deep. Other inclusions are a few areas in Putnam County that have a surface layer of loamy sand 20 to 36 inches thick.

Soils in this complex are slowly permeable. If the surface is left bare, runoff is rapid and the hazard of erosion is severe. The soils are used for crops to a limited extent, but they are most commonly used for, and are better suited to, pasture and forest. Capability unit IVe-3; woodland suitability group 3w8.

Iredell Series

The Iredell series consists of moderately well drained to somewhat poorly drained soils that have

a clayey, slowly permeable subsoil. These soils formed in residuum weathered from dark-colored basic rocks, such as diorite, gabbro, and hornblende gneiss. They occur only in Jones and Putnam Counties. Slopes range from 2 to 6 percent.

In a representative profile, the mineral soil is covered by forest litter about 1½ inches thick. The surface layer is very dark grayish-brown loam that is about 3 inches thick and is over a subsurface layer of dark grayish-brown sandy loam about 4 inches thick. The next layer, extending to a depth of 25 inches, is light olive-brown clay that is very plastic when wet. It is mottled with olive gray in the lower part. The underlying material is dark-colored, weathered basic rock that is neutral in reaction. Depth to hard rock is generally more than 6 feet.

Iredell soils are medium in natural fertility and low in organic-matter content. Reaction is slightly acid to medium acid in the upper and middle parts of these soils and neutral in the underlying material. Permeability is slow, and available water capacity is medium. Depth to the seasonal high water table ranges from 1 to 2 feet for short periods in spring. Tilth is fair. Iredell soils are very plastic in all layers when wet.

These soils are used mostly for pasture and respond well to good management. The original forest was hardwoods, chiefly oaks.

Representative profile of Iredell loam, 2 to 6 percent slopes, 9.1 miles north of Post Office in Eatonton on U.S. Highway No. 441, 3.3 miles southwest on State Highway No. 300, 1 mile southwest on woods road in Oconee National Forest, Putnam County:

O1—1½ inches to ½ inch, forest litter.
O2—½ inch to 0, black (10YR 2/1), partly decomposed forest litter mixed with small amount of mineral matter.
A1—0 to 3 inches, very dark grayish-brown (10YR 3/2) loam; weak, fine, granular structure; very friable; many fine roots; 5 percent gravel; slightly acid; abrupt, smooth boundary.
A2—3 to 7 inches, dark grayish-brown (2.5Y 4/2) sandy loam; weak, medium, granular structure; friable; many black concretions 5 millimeters to 1 centimeter in size; medium acid; abrupt, smooth boundary.
B21t—7 to 13 inches, light olive-brown (2.5Y 5/4) clay; strong, coarse, angular blocky and prismatic structure; firm; common black concretions 5 millimeters to 1 centimeter in size; plastic when wet; medium acid; gradual, wavy boundary.
B22t—13 to 20 inches, light olive-brown (2.5YR 5/4) clay; common, fine, distinct, olive (5Y 4/3) mottles; strong, coarse, angular blocky and prismatic structure; very firm, plastic; common, small, black concretions; continuous clay films on ped surfaces; slightly acid; gradual, wavy boundary.
B3t—20 to 25 inches, light olive-brown (2.5Y 5/4) clay; many, fine, distinct, olive-gray (5Y 4/2) mottles; strong, coarse, angular blocky and prismatic structure; firm; many fragments of weathered basic rock; few clay films on ped surfaces; few, small, black concretions; slightly acid; gradual, wavy boundary.
C—25 to 60 inches, soft saprolite of grayish, greenish, and black clayey material; neutral.

The solum ranges from 24 to 32 inches in thickness. The A horizon ranges from very dark grayish brown to brown and is 3 to 7 inches thick. The B2 horizon ranges from light olive brown to yellowish brown and is 13 to 16 inches thick. The lower part of the B2t horizon has common yellowish-brown, olive, and olive-brown mottles. The B3 horizon is yellowish brown or light olive brown and has common to many gray, dark grayish-brown, and olive-gray mottles. Concretions range from few to many in all horizons.

Iredell soils occur chiefly with Enon, Davidson, and Wilkes soils. They are similar to Enon soils but are more plastic in the B horizon when wet, and they formed in material that is montmorillonitic rather than of mixed mineralogy. They have a thinner solum and are less red than Davidson soils. Iredell soils have a thicker solum than Wilkes soils.

Iredell loam, 2 to 6 percent slopes (IcB).—This soil is moderately well drained and has a slowly permeable, clayey subsoil. It occurs on smooth landscapes in areas about 8 to 30 acres in size.

Included with this soil in mapping are small areas of similar soils that have a subsoil thicker than 20 inches. Also included are Enon soils and similar soils that have a gray subsoil and occur in small, wet, depressional areas.

If it is well managed, this soil responds to good management where it is used for crops and pasture. Because of the clayey subsoil, the soil is commonly used for pasture. The hazard of erosion is moderate unless the surface is protected. About 50 percent of the acreage is pastured, and most of the rest is wooded. A small amount is cultivated. Capability unit IIe-4; woodland suitability group 4c2.

Lakeland Series

The Lakeland series consists of excessively drained, sandy soils on uplands. These soils formed in thick beds of acid sand that extend to a depth of 80 inches or more. They occupy broad interstream ridges and slopes adjacent to drainageways. These soils occur chiefly in the southern parts of Baldwin and Jones Counties. Slopes range from 2 to 15 percent.

In a representative profile, the surface layer is very dark grayish-brown sand 6 inches thick. The subsurface layer is brown, loose sand 8 inches thick. The next layer, extending to a depth of 86 inches, is sand. It is yellowish brown in the upper part, light yellowish brown in the middle part, and very pale brown in the lower part. Depth to hard rock is more than 20 feet.

Lakeland soils are very low in natural fertility and organic-matter content. They are strongly acid throughout. Available water capacity is very low, and permeability is rapid. Tilth is good.

These soils are not commonly cultivated because they are droughty; however, they can be cropped under good management. The original vegetation was chiefly pines and hardwoods and an understory of shrubs and grasses.

Representative profile of Lakeland sand, 2 to 10 percent slopes, in a wooded area, 10.8 miles south of Gray on State Highway No. 18, 1.5 miles east on Bethlehem Church Road, Jones County:

A1—0 to 6 inches, very dark grayish-brown (10YR 3/2) sand; single grained; very friable; many small and medium roots; strongly acid; clear, wavy boundary.
AC—6 to 14 inches, brown (10YR 5/3) sand; single grained; very friable; strongly acid; gradual, wavy boundary.
C1—14 to 41 inches, yellowish-brown (10YR 5/4) sand; single grained; very friable; many small and medium roots; strongly acid; gradual, wavy boundary.
C2—41 to 52 inches, light yellowish-brown (10YR 6/4) sand; single grained; very friable; many small roots; strongly acid; gradual, wavy boundary.
C3—52 to 86 inches, very pale brown (10YR 7/3) sand; single

grained; very friable; many fine roots; strongly acid; gradual, wavy boundary.

The A horizon ranges from very dark grayish brown in wooded areas to grayish brown in cultivated areas and is 3 to 8 inches thick. The C horizon ranges from yellowish brown to light yellowish brown, brownish yellow, and very pale brown. In some places, the A1 horizon or Ap horizon is underlain by an AC horizon that is 4 to 8 inches thick.

Lakeland soils occur chiefly with Ailey and Esto soils. They are sandy to a greater depth than Ailey soils and they lack a fragipan, which the Ailey soils commonly have. They are sandier throughout than Esto soils and are excessively drained.

Lakeland sand, 2 to 10 percent slopes (LpC).—This soil is excessively drained and is on broad interstream ridges in areas 10 to 80 acres in size. The profile is the one described as representative for the series (fig. 6).

Included with this soil in mapping are small areas of loose sand underlain by brittle and friable clay.

Because this soil is one of the most droughty soils in the survey area, it is seldom used for cultivated crops. However, in moist years fair response can be expected from row crops and pasture with excellent management. Over half the acreage is in forest, which includes loblolly, slash, and longleaf pines. Capability unit IVs-2; woodland suitability group 4s2.

Lakeland sand, 10 to 15 percent slopes (LpD).—This soil is deep and excessively drained and is on the sides of uplands in areas about 5 to 30 acres in size. The profile is similar to the one described as representative for the Lakeland series, but the underlying layers are yellowish brown to yellow.

Included with this soil in mapping are small areas of loose sand underlain by brittle clay at a depth of 45 to 70 inches.

Because this sandy soil is strongly sloping, rapidly permeable, and droughty, it is not suited to or used for cultivated crops. It is used mostly for trees, especially pines. Capability unit VIs-1; woodland suitability group 4s2.

Norfolk Series

The Norfolk series consists of friable, well-drained soils that formed in loamy material of marine origin.

Figure 6.—A profile of Lakeland sand, 2 to 10 percent slopes.

These soils are on uplands and occupy the broad interstream ridges and a few narrow side slopes adjacent to drainageways. They occur only in Baldwin and Jones Counties. Slopes range from 0 to 10 percent.

In a representative profile, the surface layer is dark grayish-brown loamy sand 10 inches thick. Below this is a layer of brownish-yellow sandy loam 7 inches thick. The next layer is yellowish-brown sandy clay loam, about 60 inches thick, that is mottled with strong brown and yellowish red in the middle part and with red, strong brown, and light gray in the lower part. Depth to hard rock is more than 20 feet.

Norfolk soils are low in natural fertility and organic-matter content. They are strongly acid throughout. Available water capacity is medium, and permeability is moderate. Tilth is good.

These soils are among the better soils for farming in Baldwin and Jones Counties. They are well suited to most locally grown crops, which respond well to good management. The native vegetation is pines and hardwoods with an understory of shrubs and grasses.

Representative profile of Norfolk loamy sand, 2 to 6 percent slopes, 8.9 miles southeast of Milledgeville Post Office on State Highway No. 24, 100 yards south in idle field, Baldwin County:

Ap—0 to 10 inches, dark grayish-brown (10YR 4/2) loamy sand; weak, fine, granular structure; very friable; many fine roots; strongly acid; abrupt, smooth boundary.

B1—10 to 17 inches, brownish-yellow (10YR 6/6) sandy loam; weak, medium, subangular blocky structure; very friable; few fine roots; numerous old root and worm holes filled with material from the Ap horizon; few small quartz pebbles; strongly acid; clear, wavy boundary.

B21t—17 to 33 inches, yellowish-brown (10YR 5/8) sandy clay loam; few, fine, distinct mottles of red; weak, medium, subangular blocky structure; patchy clay films on ped surfaces; few fine roots; few pebbles; strongly acid; gradual, wavy boundary.

B22t—33 to 45 inches, yellowish-brown (10YR 5/8) sandy clay loam; many, medium, distinct mottles of yellowish red (5YR 4/8) and strong brown (7.5YR 5/8); weak, medium, subangular blocky structure; friable; discontinuous clay films on ped surfaces; few fine roots; strongly acid; gradual, wavy boundary.

B23t—45 to 80 inches, yellowish-brown (10YR 5/8) sandy clay loam; coarse, medium, prominent mottles of red (2.5YR 4/8), strong brown (7.5YR 5/6), and light gray (10YR 7/2); weak, medium, subangular blocky structure; friable; discontinuous clay films on ped surfaces; about 3 percent plinthite; few fine roots; strongly acid.

The solum ranges from 60 to more than 80 inches in thickness. The Ap and A1 horizons range from dark grayish brown to grayish brown and are 6 to 19 inches thick. The A2 horizon, where present, is dark grayish brown, yellowish brown, or light yellowish brown and is loamy sand or sandy loam. The B21t and B22t horizons are yellowish brown or strong brown and have few to many mottles of red and yellowish red. The B23t horizon is yellowish brown or strong brown and is sandy clay loam or clay loam that has common to many mottles of red, brown, and grayish brown. This horizon, in some areas, is light brownish gray or brownish gray and has many mottles in shades of brown and red. Content of plinthite ranges from none to about 4 percent, but the larger amount is in the lower part of the B23 horizon.

Norfolk soils occur with Orangeburg, Ailey, and Lakeland soils. They have a B horizon that is yellower and browner than the reddish B horizon of the Orangeburg soils. They

have a thinner A horizon and a thicker B horizon than Ailey soils. Norfolk soils are less sandy throughout than the Lakeland soils.

Norfolk loamy sand, 0 to 2 percent slopes (NhA).—This soil is well drained and is on broad ridges in areas generally 15 to 100 acres in size.

Included with this soil in mapping are small areas of soils that have a surface layer of sandy loam to fine sandy loam. Also included are similar soils that have a slightly thinner combined surface layer and subsoil.

This soil is among the better soils for farming in the survey area (fig. 7). Crops respond well to good management. This soil is suited to many kinds of crops. Among the suitable crops are cotton, corn, peanuts, small grain, and soybeans (fig. 8). Pecan trees, pasture grasses, and legumes also grow well. Most of the acreage is in tilled crops or orchards, but small areas are in pasture or trees. Capability unit I-1(C); woodland suitability group 2o1.

Norfolk loamy sand, 2 to 6 percent slopes (NhB).—This soil is well drained and is on broad ridgetops in areas generally 5 to 90 acres in size. The profile is the one described as representative for the series.

Included with this soil in mapping are small areas of soils that have a surface layer of sandy loam or fine sandy loam. Also included are areas that are eroded, and in these areas tillage has mixed some of the upper part of the subsoil with the original surface layer.

Runoff from bare surfaces is rapid enough that erosion is a hazard. This soil is suited to most of the locally grown crops, which respond well to good management. More than half the total acreage is in crops. Capability unit IIe-1(C); woodland suitability group 2o1.

Norfolk loamy sand, 6 to 10 percent slopes (NhC).—This soil is well drained and is on short side slopes in areas 3 to 25 acres in size.

Included with this soil in mapping are small areas of soils that have a surface layer of sandy loam or fine sandy loam. Also included are few small eroded areas; in these the plow layer extends into the upper part of the subsoil and the surface layer is strong-brown to yellowish-brown sandy loam.

This soil is used for and is suited to the crops commonly grown in the area, but erosion is a hazard unless the soil is protected. About half the acreage is in crops, and the rest is in pasture and forest. Capability unit IIIe-1(C); woodland suitability group 2o1.

Figure 7.—Seedbed ready for planting. The soil is Norfolk loamy sand, 0 to 2 percent slopes.

Figure 8.—In foreground, the crop is soybeans and the soil is Norfolk loamy sand, 0 to 2 percent slopes. In background, the soil is Norfolk loamy sand, 6 to 10 percent slopes.

Orangeburg Series

The Orangeburg series consists of well-drained soils that formed in loamy deposits of marine origin on uplands. These soils occupy broad interstream ridges and side slopes adjacent to drainageways. They occur only in Baldwin and Jones Counties. Slopes range from 2 to 20 percent.

In a representative profile, the surface layer is very dark grayish-brown loamy sand 6 inches thick. The subsurface layer is brown sandy loam 11 inches thick. The next layer is friable, red and dark-red sandy clay loam about 63 inches thick. Depth to hard rock is more than 20 feet.

Orangeburg soils are low in natural fertility and organic-matter content. They are strongly acid to very strongly acid throughout. Available water capacity is medium, and permeability is moderate. Tilth is good.

These soils are among the best soils for farming in Baldwin and Jones Counties. The more gently sloping soils respond well to good management and are used for most crops. About half the acreage is cultivated or pastured. The native vegetation is chiefly mixed hardwoods and pines and an understory of shrubs, vines, and grasses.

Representative profile of Orangeburg loamy sand, 2 to 6 percent slopes, in forest 7.8 miles east of Milledgeville, on State Highway No. 24, 0.6 mile east on Deepstep Road, Baldwin County:

Ap—0 to 6 inches, very dark grayish-brown (10YR 3/2) loamy sand; weak, fine, granular structure; very friable; many fine roots; strongly acid; abrupt, smooth boundary.

A2—6 to 17 inches, brown (10YR 5/3) sandy loam; weak, fine, granular structure; very friable; few fine roots; strongly acid; clear, smooth boundary.

B1t—17 to 22 inches, red (2.5YR 4/6) sandy clay loam; weak, fine, subangular blocky structure; friable; clay bridging between sand grains; few fine roots; very strongly acid; clear, wavy boundary.

B21t—22 to38 inches, dark-red (2.5YR 3/6) sandy clay loam; moderate, medium, subangular blocky structure; friable; clay films on ped surfaces; few fine roots; very strongly acid; gradual, wavy boundary.

B22t—38 to 62 inches, red (2.5YR 4/8) sandy clay loam; moderate, medium, subangular blocky structure; friable; patchy clay films on ped surfaces; few fine roots; very strongly acid; gradual, wavy boundary.

B23t—62 to 80 inches, red (2.5YR 4/6) sandy clay loam; few, medium, distinct, strong-brown (7.5YR 5/8) mottles; moderate, medium, subangular blocky structure; friable; clay bridging between sand grains; few fine roots; very strongly acid.

The Ap horizon ranges from very dark grayish brown to brown and is 4 to 10 inches thick. The A2 horizon ranges from brown to yellowish brown and is 3 to 11 inches thick. It is mostly sandy loam, but is loamy sand in a few areas. The A2 horizon is lacking in some places. The B1 horizon is strong brown to red and is sandy loam or sandy clay loam. The B2t horizon is red to dark red and is sandy clay loam or clay loam. In places the B23t horizon is mottled with yellowish brown or strong brown.

Orangeburg soils occur with the Red Bay, Norfolk, and Vaucluse soils. They have a red B horizon, whereas the Norfolk soils have a yellowish-brown B horizon. They have a less reddish Ap horizon than Red Bay soils. Orangeburg soils are more friable and less mottled than Vaucluse soils.

Orangeburg loamy sand, 2 to 6 percent slopes (OeB).—This well-drained soil is on broad interstream ridges in areas generally 10 to 60 acres in size. The profile is the one described as representative for the series.

Included with this soil in mapping are small areas of soils that have a surface layer of sandy loam or fine sandy loam and eroded areas where the plow layer is yellowish-red friable sandy clay loam. Also included are a few small areas of Red Bay soils.

Runoff is rapid enough in bare areas that erosion is a moderate hazard. This soil is suited to most locally grown crops, which respond well to good management. It is also well suited to pasture and trees. Capability unit IIe-1(C); woodland suitability group 2o1.

Orangeburg loamy sand, 6 to 10 percent slopes (OeC).—This soil is well drained and is on short side slopes of ridges in areas 3 to 40 acres in size. The profile is similar to the one described as representative for the series, but the surface layer is generally slightly thinner.

Included with this soil in mapping are small areas of soils that have a surface layer of sandy loam to fine sandy loam. In a few eroded areas, the surface layer extends into and is mixed with the upper part of the subsoil.

This soil is suited to most locally grown crops; however, on bare surfaces water runs off and erosion is a hazard. This soil is also suited to pasture and trees. About half the acreage is wooded; the rest is cultivated or pastured. Capability unit IIIe-1(C); woodland suitability group 2o1.

Orangeburg loamy sand, 10 to 20 percent slopes (OeE).—This soil is well drained and is on hillsides in areas about 10 to 60 acres in size. It has a profile similar to the one described as representative for the series, but in certain areas near the base of slopes, the underlying material is residual, clayey Piedmont material at a depth of about 6 feet.

Included with this soil in mapping are small areas of soils that have a surface layer of sandy loam or fine sandy loam. Small included spots are eroded. Also included are areas of soils that have slopes of 20 to 30 percent.

This soil is not suited to cultivated crops, because it is too steep. It is suited to pasture and trees. The present use is chiefly woodland. Capability unit VIe-1(C); woodland suitability group 2o1.

Pacolet Series

The Pacolet series consists of steep, well-drained soils that formed in material weathered from granite, gneiss, and other metamorphic rocks. These soils are in small areas adjacent to drainageways on uplands. Slopes range from 10 to 25 percent.

In a representative profile, the surface layer is pale-brown sandy loam 6 inches thick. Below this is a layer of red clay, 16 inches thick, that is over a layer of red clay loam 14 inches thick. This is underlain by material partly weathered from acid rock. Depth to hard rock is generally more than 6 feet.

These soils are low in natural fertility and organic-matter content. They are medium acid to strongly acid throughout. Available water capacity is medium, and permeability is moderate. Tilth is good.

Pacolet soils are not used for crops and are seldom used for pasture. Most of the acreage is in mixed hardwoods. Some areas that were recently used for crops are now in shortleaf and loblolly pines.

Representative profile of Pacolet sandy loam, 10 to 25 percent slopes, in a wooded area 8.4 miles south of courthouse in Eatonton, on U.S. Highway No. 441; 2.9 miles northeast on paved road; 0.6 mile south on paved road and 0.7 mile southeast on a dirt road, Putnam County:

Ap—0 to 6 inches, pale-brown (10YR 6/3) sandy loam; weak, fine, granular structure; very friable; many fine roots; few pebbles; medium acid; abrupt, wavy boundary.

B2t—6 to 22 inches, red (2.5YR 4/6) clay; common, fine and medium, prominent mottles of yellowish brown (10YR 5/8); strong, medium, subangular blocky structure; firm; common roots; small amount of material from A horizon; continuous clay films on red surfaces; common fine mica flakes; strongly acid; gradual, wavy boundary.

B3t—22 to 36 inches, red (2.5YR 4/6) clay loam; medium, coarse, angular blocky structure; firm; few roots; continuous clay films on ped surfaces; many mica flakes; strongly acid; gradual, wavy boundary.

C—36 to 54 inches, weathered granite saprolite, mottled in shades of red, yellow, brown, gray, and black.

The solum ranges from 22 to 36 inches in thickness. The A horizon ranges from dark grayish brown to brown and is 3 to 10 inches thick. The B2t horizon is sandy clay to clay and is 10 to 24 inches thick.

Pacolet soils occur chiefly with Cecil, Gwinnett, Vance, and Wilkes soils. They have similar colors but a thinner solum than the Cecil soils. They are redder in the B2t horizon than the Vance soils. Pacolet soils have a redder and thicker solum than the Wilkes soils.

Pacolet sandy loam, 10 to 25 percent slopes (PfE).—

This soil is mostly adjacent to drainageways in areas about 15 to 80 acres in size.

Included with this soil in mapping are small areas of severely eroded soils that have a surface layer of yellowish-red to red sandy clay loam. Also included are small areas of gravelly soils and of similar soils that have a subsoil of sandy loam.

This soil is suited to trees and pasture. The hazard of erosion is moderate to severe if the surface is not protected. Some of the acreage was cultivated at some time in the past, but the soil is generally too steep for this use. Most of the acreage is in forest, a good use. Capability unit VIe-1; woodland suitability group 3r8.

Red Bay Series

The Red Bay series consists of well-drained soils that formed in loamy deposits of marine origin. These soils occupy interstream ridges and slopes adjacent to drainageways on uplands. They occur only in Baldwin and Jones Counties. Slopes range from 2 to 10 percent.

In a representative profile, the surface layer is dark reddish-brown loamy sand 8 inches thick. Below this is dark-red, friable sandy clay loam that extends to a depth of about 72 inches. Depth to hard rock is more than 20 feet.

Red Bay soils are low in natural fertility and organic-matter content. They are strongly acid throughout. Available water capacity is medium, and permeability is moderate. Tilth is good.

More than half the acreage is in pine forest. These soils are well suited to crops, pasture, and trees. The native vegetation is chiefly mixed hardwoods and pines and an understory of shrubs and grasses.

Representative profile of Red Bay loamy sand, 2 to 6 percent slopes, 5.9 miles west of Milledgeville on State Highway No. 22; 3.2 miles north on paved Shady Rest Road in a cultivated field, Baldwin County:

Ap—0 to 8 inches, dark reddish-brown (5YR 3/3) loamy sand; weak, fine, granular structure; very friable; many small roots; strongly acid; abrupt, smooth boundary.

B1t—8 to 17 inches, dark-red (2.5YR 3/6) sandy clay loam; weak, medium, subangular blocky structure; friable; weak clay bridgings between sand grains; strongly acid; clear, smooth boundary.

B21t—17 to 37 inches, dark-red (10YR 3/6) sandy clay loam; weak, medium, subangular blocky structure; friable; patchy clay films on ped surfaces; common fine roots; strongly acid; gradual, wavy boundary.

B22t—37 to 72 inches, dark-red (2.5YR 3/6) sandy clay loam; weak, medium, subangular blocky structure; friable; patchy clay films on ped surfaces; few fine roots; strongly acid.

The A horizon ranges from dark reddish brown to dusky red and is 6 to 9 inches thick. The texture ranges through loamy sand and sandy loam. The B2t horizon is dark red to dusky red and is sandy clay loam or sandy loam.

Red Bay soils occur chiefly with Orangeburg and Vaucluse soils. They have darker and redder A and B horizons than those soils.

Red Bay loamy sand, 2 to 6 percent slopes (RgB).—This soil is friable and well drained and is on broad ridgetops in areas about 5 to 40 acres in size. The profile is the one described as representative for the Red Bay series.

Included with this soil in mapping are small areas of eroded soils that have a surface layer of sandy loam. These areas have a few rills and shallow gullies.

This soil is well suited to most locally grown crops, but unless the surface is protected, runoff is rapid enough that erosion is a moderate hazard. Crops respond well to good management. This soil is also well suited to pasture and pine trees. Most of the acreage is wooded. Capability unit IIe-1(C); woodland suitability group 2o1.

Red Bay sandy loam, 6 to 10 percent slopes, eroded (RhC2).—This soil is well drained and is on uplands and on short side slopes. It is in areas 5 to 30 acres in size. The profile is similar to the one described as representative for the Red Bay series, but the surface layer is sandy loam.

In most areas, the plow layer has been thinned by erosion and extends into and is mixed with the upper part of the subsoil. A few gullies and rills have been formed in most areas.

This soil is suited to most locally grown crops, and a few fields are cultivated or in pasture. The hazard of erosion is severe in unprotected areas. This soil is also well suited to pasture and pine trees. Most of the acreage is wooded. Capability unit IIIe-1(C); woodland suitability group 2o1.

Starr Series

The Starr series consists of well-drained, loamy soils that formed adjacent to streams on the higher bottom lands and in upland depressions at the head of drainageways. Starr soils are in small areas and are widely scattered in Baldwin, Jones, and Putnam Counties. Slopes range from 0 to 2 percent.

In a representative profile, the surface layer is reddish-brown sandy loam about 7 inches thick. Beneath this is a layer of reddish-brown clay loam 11 inches thick. The next layer is red clay loam 12 inches thick. The next 18 inches is red clay that has brownish-yellow mottles in the lower part. Beneath this, to a depth of 64 inches, is dark-red clay loam. Depth to hard rock is generally more than 20 feet.

Starr soils are moderate in natural fertility and low in organic-matter content. They are strongly acid to medium acid throughout. Permeability is moderately rapid, and available water capacity is medium to high. Tilth is good.

These soils are suited to most locally grown crops. The soils are farmed to some extent, but about half the acreage is wooded. The native vegetation was yellow-poplar, oaks, hickory, and pines.

The Starr soils in Baldwin, Jones, and Putnam Counties occur in undifferentiated groups with Chewacla and Toccoa soils.

Representative profile of Starr sandy loam in an area of Starr and Toccoa soils, 1.1 miles west of the Clinton-Wayside Road on a dirt county road, in an area of young pines, Jones County:

Ap—0 to 7 inches, reddish-brown (5YR 4/4) sandy loam; weak, fine, granular structure; very friable; many fine

and medium roots; strongly acid; abrupt, smooth boundary.

B21—7 to 18 inches, reddish-brown (5YR 4/4) clay loam; weak and moderate, medium and fine, subangular blocky structure; friable; common fine and medium roots; weak clay bridgings between sand grains; strongly acid; clear, smooth boundary.

B22—18 to 30 inches, red (2.5YR 4/8) clay loam; moderate, medium, subangular blocky structure; firm; few fine and medium roots; weak clay bridgings between sand grains; few quartz fragments; common fine mica flakes; strongly acid; clear, smooth boundary.

IIB23t—30 to 42 inches, red (10R 4/8) clay; strong, medium, subangular blocky structure; firm; common fine mica flakes; weak clay bridgings; patchy clay films on ped surfaces; few quartz fragments; strongly acid; clear, smooth boundary.

IIB24t—42 to 48 inches, red (10R 4/8) clay; common, medium, prominent, brownish-yellow (10YR 6/8) mottles; firm; common fine mica flakes; small feldspar fragments; patchy clay films on ped surfaces; clay bridgings of sand grains; strongly acid; gradual, wavy boundary.

IIB3t—48 to 64 inches, dark-red (2.5YR 3/6) clay loam; moderate, medium, subangular blocky structure; friable; many fine mica flakes; clay bridgings of sand grains, and a few patchy clay films on ped surfaces; small feldspar fragments; strongly acid.

The Ap horizon is dark reddish brown to yellowish red and is fine sandy loam, sandy loam, or silt loam. It is 4 to 7 inches thick. The B1 horizon, where present, ranges from dark yellowish brown to yellowish red and from loam to clay loam. It is 10 to 18 inches thick. The B2 horizon is dark reddish brown to yellowish red and red. It is loam, clay loam, and sandy clay loam 12 to 30 inches thick.

Starr soils occur chiefly with Chewacla and Toccoa soils and, to a lesser extent, with Davidson and Congaree soils. They are better drained than Chewacla soils and are redder than Toccoa soils. They contain less clay in the B horizon than the Davidson soils. Starr soils contain more clay than the Congaree soils, and they are redder in the B horizon than are the Congaree soils in that part of the C horizon that occurs at a similar depth.

Starr and Toccoa soils (Sen).—This undifferentiated group consists chiefly of Starr and Toccoa soils that formed in local alluvium in upland depressions at the head of drainageways. These soils are in areas of about 3 to 10 acres. Slopes range from 0 to 2 percent. The pattern and proportion of soils are not uniform from one area to another, but each area mapped as this unit generally contains Starr and Toccoa soils. The Starr soils make up about 50 percent of the total acreage; Toccoa soils, about 35 percent; and similar soils that have a subsoil of brownish sandy loam, the remaining 15 percent.

The Starr and Toccoa soils have profiles similar to the ones described as representative for their respective series, but the surface layer of Starr soils ranges from fine sandy loam to sandy loam and silt loam and that of Toccoa soils ranges from sandy loam to sandy clay loam. Soils of both major series in this unit generally are underlain at a depth of 30 to 50 inches by residual soil or residual material.

Soils of this mapping unit are subject to shallow flooding that occurs less frequently than once in 5 years.

These soils are suitable for farming and are suited to all crops and pasture grown in the survey area; they are also suited to trees. They respond well to good management, especially to applications of fertilizer and lime. About 50 percent of the acreage is cultivated or pastured; the rest is wooded. Capability unit I-1; woodland suitability group 1o7.

Susquehanna Series

The Susquehanna series consists of somewhat poorly drained soils that have a clayey underlying layer. These soils formed in thick beds of clayey material within the Coastal Plain Major Land Resource Area. They occur only in small areas in Baldwin and Jones Counties. Slopes range from 5 to 15 percent.

In a representative profile, the surface layer is brown fine sandy loam about 5 inches thick. The subsoil is mottled clay and sandy clay that extends to a depth of 80 inches. This layer is yellowish red and red mottled with grayish brown in the upper part; mottled yellowish brown, red, and gray in the middle part; and gray mottled with red in the lower part. When wet, this soil is very plastic. Depth to hard rock is more than 20 feet.

These soils are low in natural fertility and organic-matter content. They are very strongly acid throughout. Available water capacity is high, and permeability is very slow. A seasonal high water table is as shallow as 20 inches for short periods in winter and spring. Tilth is generally poor.

Susquehanna soils are mostly in forest but are also in some pasture. They are generally not considered to be suited to row crops, because of slope and poor workability. The native vegetation consists mainly of blackjack oaks, red oaks, and shortleaf and loblolly pines.

Representative profile of Susquehanna fine sandy loam, 5 to 15 percent slopes, in a stand of young pines, 0.6 mile southwest of Georgia Railroad crossing on State Highway No. 49, and approximately 1 mile north of the Bibb County line, Jones County:

Ap—0 to 5 inches, brown (10YR 5/3) fine sandy loam; weak, fine, granular structure; friable; many fine roots; very strongly acid; abrupt, wavy boundary.

B21t—5 to 14 inches, yellowish-red (5YR 4/6) clay; few, fine, prominent mottles of grayish brown (10YR 5/2); strong, medium, angular blocky structure; very firm; continuous clay films on ped surfaces; very strongly acid; gradual, wavy boundary.

B22t—14 to 24 inches, red (2.5YR 4/6) clay; common, medium, prominent mottles of grayish brown (10YR 5/2); strong, fine, angular blocky structure; very firm; clay films on ped surfaces; very strongly acid; gradual, wavy boundary.

B23t—24 to 55 inches, mottled yellowish-brown (10YR 5/6), red (2.5YR 4/6), and gray (5Y 6/1) sandy clay; moderate, fine, subangular blocky structure; very firm; very strongly acid; gradual, wavy boundary.

B23tg—55 to 80 inches, gray (5Y 5/1) clay; common, medium and coarse, prominent, red (2.5YR 4/6) mottles; moderate, medium, angular blocky structure; very firm; continuous clay films on ped surfaces; very strongly acid.

The Ap horizon ranges from very dark grayish brown to brownish yellow and brown. It is 2 to 5 inches thick. The B21t horizon is reddish brown or yellowish red and is commonly mottled with grayish brown, light grayish brown, or gray. The B22t horizon ranges from gray to yellowish red and has common to many mottles. The B24t horizon is predominantly in shades of gray mottled with shades of gray, brown, and red.

Susquehanna soils occur chiefly with Vaucluse, Lakeland,

and Ailey soils. They have a more clayey B horizon and are less well drained than all of those soils.

Susquehanna fine sandy loam, 5 to 15 percent slopes (SiD).—This soil is somewhat poorly drained and is on uplands in areas 5 to 35 acres in size. It occurs in the southern parts of Baldwin and Jones Counties.

Included with this soil in mapping are small areas of eroded soils in which the present surface layer contains clay balls from the subsoil that have been mixed with the original surface layer by tillage. Also included are some areas of soils that have a surface layer of sandy loam.

Runoff is rapid on unprotected surfaces, and the hazard of erosion is severe. This soil is not generally considered suitable for cultivation, because of the clayey subsoil and the slope. It can be pastured or used for woodland. Most of the acreage is wooded or is idle. Capability unit VIe-2; woodland suitability group 3c2.

Toccoa Series

The Toccoa series consists of well-drained, loamy, alluvial soils on flood plains and in depressions of the uplands. These soils occur in both small and fairly broad areas. Slopes range from 0 to 2 percent.

In a representative profile, the surface layer is reddish-brown sandy loam about 5 inches thick. The subsurface layer is reddish-brown fine sandy loam about 14 inches thick. The next layer is brown fine sandy loam 23 inches thick. The next layer is yellowish-red silt loam that is mottled with dark brown and pale brown and is about 12 inches thick. The underlying layer is stratified, dark yellowish-brown very fine sandy loam that is mottled with yellow, strong brown, and very dark brown. Depth to hard rock is generally more than 10 feet.

Toccoa soils are moderate in natural fertility and low in organic-matter content. They are slightly acid in the upper and middle parts and neutral in the lower part. Available water capacity is medium, and permeability is moderately rapid. A seasonal high water table is within 30 to 36 inches of the surface for short periods in winter and spring. Tilth is good.

These soils are used for crops, pasture, and forest and are suited to these uses. The natural vegetation was mixed hardwoods, such as oaks, yellow-poplar, and sweetgum.

The Toccoa soils in Baldwin, Jones, and Putnam Counties occur only in undifferentiated groups with Congaree and Starr soils.

Representative profile of Toccoa sandy loam in an area of Congaree and Toccoa soils near the Milledgeville city water works intake, 200 yards from the east end of Walton Street on the flood plain of the Oconee River, Baldwin County:

Ap—0 to 5 inches, reddish-brown (5YR 4/4) sandy loam; weak, fine, granular structure; very friable; few fine mica flakes; many roots; slightly acid; abrupt, smooth boundary.

A2—5 to 19 inches, reddish-brown (5YR 4/4) fine sandy loam; weak, fine, subangular blocky and massive; very friable; few fine mica flakes; few roots; slightly acid; gradual, wavy boundary.

C1—19 to 26 inches, brown (7.5YR 4/2) fine sandy loam; few, fine, faint, very pale brown mottles; massive; very friable; few fine mica flakes; few roots; slightly acid; gradual, wavy boundary.

C2—26 to 42 inches, brown (7.5YR 5/4) fine sandy loam; few, fine, faint, yellow mottles; massive; very friable; few fine mica flakes; slightly acid; gradual, wavy boundary.

C3—42 to 54 inches, yellowish-red (5YR 4/8) silt loam; few, fine, faint, dark-brown and pale-brown mottles; massive; very friable; few fine mica flakes; slightly acid; gradual, wavy boundary.

C4—54 to 64 inches, dark yellowish-brown (10YR 4/4) very fine sandy loam; common, fine, yellow (10YR 7/8), strong-brown (7.5YR 5/8), and very dark brown (7.5YR 3/2) mottles; friable; bedding planes evident; common fine mica flakes; neutral.

The Ap horizon ranges from yellowish brown to brown, reddish brown, and dark reddish brown in color and from loamy sand to sandy loam and sandy clay loam in texture. The C1 and C2 horizons range from yellowish brown to dark red and from stratified loamy sand to sandy clay loam. The 10- to 40-inch layer averages sandy loam.

Toccoa soils occur chiefly with Congaree and Starr soils. They contain more sand in the upper 40 inches than Congaree and Starr soils and are redder than Congaree soils and less red than Starr soils.

Vance Series

The Vance series consists of well-drained soils that formed in material weathered from acid crystalline rock. These soils have a very firm, clayey subsoil. They occupy fairly smooth interstream ridges and slopes adjacent to drainageways. Vance soils are widely scattered throughout Putnam County and in parts of Baldwin and Jones Counties. Slopes range from 2 to 25 percent.

In a representative profile, the mineral soil is covered by about 2 inches of decomposing forest litter. The surface layer is light brownish-gray and brownish-yellow sandy loam 7 inches thick. Beneath this is a layer of yellowish-red, very firm clay, 30 inches thick, that is mottled with strong brown and red and also with gray in the lower part. The underlying material is streaked and mottled, reddish-yellow, strong-brown, and light-gray weathered rock. Depth to hard rock is generally more than 10 feet (fig. 9).

These soils are low in natural fertility and organic-matter content. They are strongly acid throughout. Available water capacity is medium, and permeability is slow. Tilth is generally good, but in areas that have a surface layer of sandy clay loam, it is poor.

Most of the acreage has been cleared and cropped, but now more than two-thirds of the gently sloping and steeper acreage is in forest. These soils are suited to farming and forest. The major trees are oak, hickory, dogwood, sweetgum, and shortleaf and loblolly pines.

Representative profile of Vance sandy loam, 2 to 6 percent slopes, eroded, 0.7 mile south of Round Oak on State Highway No. 11, 1 mile west just off dirt road, in an area of loblolly pines, Jones County:

O1—2 inches to ½ inch, decomposing pine needles, leaves from hardwood trees, and twigs.

O2—½ inch to 0, dark-brown (7.5YR 3/2), mixed, decomposing forest litter and mineral matter.

Ap1—0 to 1 inch, light brownish-gray (10YR 6/2) sandy loam;

Figure 9.—A profile of Vance sandy loam, 2 to 6 percent slopes, eroded.

weak, fine granular structure; very friable; common fine roots; 3 percent organic matter; strongly acid; abrupt, smooth boundary.

Ap2—1 to 7 inches, brownish-yellow (10YR 6/6) sandy loam; weak, medium, granular structure; very friable; 3 percent gravel; strongly acid; clear, smooth boundary.

B21t—7 to 16 inches, yellowish-red (5YR 4/6) clay; many, medium, distinct mottles of strong brown (7.5YR 5/8); moderate, medium, angular blocky structure; very firm; discontinuous clay films on ped surfaces; sticky when wet; few fine mica flakes; strongly acid; gradual, wavy boundary.

B22t—16 to 32 inches, yellowish-red (5YR 5/6) clay; many, medium, prominent mottles of red (2.5YR 4/8) and strong brown (7.5YR 5/8); moderate, medium, angular blocky structure; very firm; continuous clay films on ped surfaces; strongly acid; gradual, wavy boundary.

B23t—32 to 37 inches, yellowish-red (5YR 5/8) clay; many, coarse, prominent mottles of red (2.5YR 4/8), strong brown (7.5YR 5/8), and light gray (10YR 7/2); moderate, medium, angular blocky structure; very firm; continuous clay films on ped surfaces; strongly acid; gradual, wavy boundary.

C—37 to 60 inches, streaked and mottled reddish-yellow (7.5YR 6/8), strong-brown (7.5YR 5/6), and gray (10YR 6/1) saprolite that crushes to sandy clay loam; rock form is visible, and there are fine mica flakes and feldspar crystals.

The Ap horizon is dark grayish brown, brown, light brownish gray, yellowish brown, or brownish yellow and is sandy loam to sandy clay loam. It is 2 to 10 inches thick. The B1 horizon, where present, is yellowish brown to yellowish red and is clay loam or sandy clay loam 5 to 12 inches thick. The B21t and B22t horizons range from yellowish brown to yellowish red and generally have common to many mottles in shades of brown and red. The B23t horizon has gray or light-gray mottles in some profiles; however, the gray mottles are not wetness mottles. The solum ranges from about 26 to 50 inches in thickness.

Vance soils occur with Cecil, Enon, Gwinnett, Helena, and Wilkes soils. They are less red throughout the B2t horizon than the Cecil and Gwinnett soils. They are slightly redder and less plastic when wet in the B horizon than Enon soils. Vance soils are better drained than Helena soils and have a thicker solum than Wilkes soils.

Vance sandy loam, 2 to 6 percent slopes, eroded (VaB2).—This soil occurs on fairly smooth ridgetops in areas 5 to 25 acres in size. The profile is the one described as representative for the Vance series. In most places the present surface layer has been thinned by erosion and tillage has mixed some of the upper part of the subsoil with remnants of the original surface layer. In cultivated fields the subsoil is exposed in spots and rills and shallow gullies are present.

Included with this soil in mapping are a few areas of severely eroded soils that have a surface layer of brown sandy clay loam. Also included are similar soils that have a subsoil of mottled, red sandy clay loam and clay and other soils that have a combined surface layer and subsoil more than 50 inches thick.

Good management is necessary if this soil is cultivated because the hazard of erosion is moderately severe unless the surface layer is protected. This soil is suited to the commonly grown crops, pasture, and trees. Most of the acreage was cultivated in the past, but now most of it is in pasture or loblolly pine, a good use. Capability unit IIe-3; woodland suitability group 3o7.

Vance sandy loam, 6 to 10 percent slopes, eroded (VaC2).—This soil is on side slopes adjacent to drainageways in areas 3 to 20 acres in size. The present surface layer generally extends into the upper part of the subsoil, and its color varies with the amount of subsoil material that has been mixed with the original surface layer. There are a few shallow gullies and a few deep ones.

Included with this soil in mapping are a few areas of severely eroded soils that have a surface layer of brown sandy clay loam. Also included are areas of similar soils that have a subsoil of mottled, red sandy clay loam and clay.

Under good management, this soil can be used for crops, but erosion is a severe hazard unless the soil surface is protected. About one-third of the acreage is cultivated or pastured; the rest is wooded, a good use. Capability unit IIIe-3; woodland suitability group 3o7.

Vance sandy loam, 10 to 25 percent slopes, eroded (VaE2).—This soil is adjacent to drainageways in areas 3 to 20 acres in size. In most areas the plow layer extends into the subsoil and its color varies with the amount of subsoil material that has been mixed with remnants of the original surface layer.

In some areas the subsoil is exposed; other areas have been cut by shallow gullies and rills.

Included with this soil in mapping are a few areas of severely eroded soils that have a surface layer of brown to yellowish-brown sandy clay loam. Also included are areas of similar soils that have a red clayey subsoil and common brown mottles.

Because of slope and the hazard of erosion, this soil is not suited to cultivated crops. Most of the acreage is in forest, and the rest is in pasture. Capability unit VIe-1; woodland suitability group 3r8.

Vance sandy clay loam, 2 to 10 percent slopes, eroded (VbC2).—This soil is in areas 3 to 25 acres in size. The surface layer extends well into the subsoil, and its color depends on the amount of clayey material that has been mixed with remnants of the original surface layer. The present surface layer is mainly yellowish-brown sandy clay loam 2 to 5 inches thick. The subsoil is yellowish-red clay. There are many shallow and deep gullies.

Included with this soil in mapping are a few less eroded areas that have a surface layer of dark grayish-brown sandy loam. Also included are areas of similar soils that have a red clay subsoil and common brown mottles.

Under good management, this soil can be farmed and is suited to most locally grown crops, but the hazard of erosion is severe unless the surface is protected. Most of the acreage was cultivated in the past but is now in pasture or loblolly pine, a good use. Capability unit IVe-3; woodland suitability group 4c2e.

Vaucluse Series

The Vaucluse series consists of well-drained soils that have a firm subsoil. These soils developed in marine sand and clay. They occur mostly as fairly small areas in parts of Baldwin and Jones Counties. Slopes range from 2 to 10 percent.

In a representative profile, the surface layer is brown loamy sand 3 inches thick. The subsurface layer is yellowish-brown, very friable loamy sand 6 inches thick. The next layer is about 53 inches thick. The upper 8 inches of this layer is yellowish-red sandy clay loam; the next 10 inches is yellowish-red, firm sandy clay loam; the next 18 inches is firm but brittle, yellowish-red sandy clay loam that is mottled with red and strong brown; and the lower 17 inches is mottled, firm sandy clay loam. Depth to hard rock is more than 20 feet.

Vaucluse soils are low in natural fertility and organic-matter content. They are very strongly acid throughout. Permeability is slow, and available water capacity is low. Tilth is good.

Vaucluse soils are seldom used for cultivated crops, but they can be farmed. They are occasionally used for pasture, but most of the acreage is in forest. The native vegetation is mixed hardwoods, loblolly and slash pines, and an understory of shrubs and grasses.

Representative profile of Vaucluse loamy sand, 2 to 10 percent slopes, 7 miles east of Gray, on State Highway No. 22, 3 miles north of Haddock on paved county road in a pine forest, Jones County

A1—0 to 3 inches, brown (10YR 4/3) loamy sand; weak, fine, granular structure; very friable; very strongly acid; clear, wavy boundary.

A2—3 to 9 inches, yellowish-brown (10YR 5/4) loamy sand; weak, fine, granular structure; very friable; very strongly acid; clear, wavy boundary.

B1t—9 to 17 inches, yellowish-red (5YR 4/8) sandy loam; weak, medium, subangular blocky structure; friable; sand grains coated and bridged with clay; very strongly acid; gradual, wavy boundary.

B21t—17 to 27 inches, yellowish-red (5YR 4/8) sandy clay loam; moderate, medium, subangular blocky structure; firm; few patchy clay films on ped surfaces; very strongly acid; gradual, wavy boundary.

B22t—27 to 45 inches, yellowish-red (5YR 5/6) sandy clay loam; many, medium, distinct mottles of red (10YR 4/8) and strong brown (7.5YR 5/8); weak, medium, subangular blocky structure; firm; continuous clay films on ped surfaces; brittle, particles fit closely together; very strongly acid; gradual, wavy boundary.

B23t—45 to 62 inches, mottled red (10YR 4/8), yellowish-red (5YR 4/8), strong-brown (7.5YR 5/8), and yellow (10YR 7/6) sandy clay loam; weak, coarse, subangular blocky structure; firm; few patchy clay films on ped surfaces; brittle; very strongly acid.

The Ap horizon ranges from dark grayish brown to brown and is 3 to 8 inches thick. The A2 horizon, where present, ranges from yellowish brown to strong brown and is 3 to 8 inches thick. The B2t horizon has a matrix color that ranges from yellowish red to red and mottles that are red, dark red, pale brown, yellowish brown, and light gray. The light-gray mottles are thought to be kaolin clay balls. This horizon ranges from sandy clay loam to sandy loam. Gravel and ironstone concretions range from none to common throughout the profile in some places. In some places there is a C horizon at depths of more than 60 inches; it is commonly stratified with layers of sandy clay loam, sandy loam, and loamy sand.

Vaucluse soils occur chiefly with Ailey, Norfolk, and Orangeburg soils. They have a thinner A horizon than Ailey soils and a redder B horizon than Norfolk soils. They lack the thick red B horizon of the Orangeburg soils.

Vaucluse loamy sand, 2 to 10 percent slopes (VeC).—This soil has short, choppy, uneven slopes. It occurs in areas 5 to 50 acres in size.

Included with this soil in mapping are areas of eroded soils in which some of the subsoil has been mixed with remnants of the original surface layer through tillage. Erosion has cut deep gullies in some areas, and concretions of ironstone are common in others.

This soil can be farmed, but it is seldom used for cultivated crops because of its unfavorable slopes and occurrence on the landscape. Most of the acreage is in forest, and a few areas are used for pasture. This soil is suited to pine trees. Capability unit IIIe-4; woodland suitability group 3o1.

Wehadkee Series

The Wehadkee series consists of poorly drained soils that formed in recent alluvium derived mostly from materials weathered from schist, gneiss, granite, and other metamorphic and igneous rocks. They occur on nearly level flood plains mainly along the major streams. Slopes are less than 2 percent.

In a representative profile, the surface layer is brown loam 9 inches thick. The next layer is mottled sandy clay loam about 34 inches thick. The underlying layer, extending to a depth of 54 inches, is gray,

mottled sandy loam. Depth to hard rock is generally more than 10 feet.

Wehadkee soils are low in natural fertility and medium in organic-matter content. They are medium acid or slightly acid throughout. Available water capacity is medium, and permeability is moderate. Tilth is good. These soils are flooded at least once each year and remain wet for fairly long periods. The seasonal high water table is at the surface or within 15 inches of it for a few to several months in winter and spring.

Wehadkee soils are used almost exclusively for water-tolerant hardwoods, but they can be farmed if the water problem is corrected. The native vegetation consists of water oak, blackgum, sweetgum, yellow-poplar, and elm.

Representative profile of Wehadkee loam in an area of Wehadkee soils, 8.7 miles southeast of Milledgeville Post Office on State Highway No. 24, 1.9 miles south on dirt road, 0.7 mile southeast in flood plain, Baldwin County:

Ap—0 to 9 inches, brown (7.5YR 5/2) loam; weak, fine, granular structure; friable; few fine roots; medium acid; clear, smooth boundary.

B21g—9 to 19 inches, gray (10YR 5/1) sandy clay loam; common, medium, distinct mottles of yellowish brown (10YR 5/6); weak, medium, subangular blocky structure; friable; some material from A horizon in old root channels; medium acid; gradual, smooth boundary.

B22g—19 to 43 inches, gray (10YR 5/1) sandy clay loam; common, medium, distinct mottles of yellowish brown (10YR 5/8); weak, medium, subangular blocky structure; friable; medium acid; gradual, wavy boundary.

Cg—43 to 54 inches, gray (10YR 5/1) sandy loam; common, medium, distinct mottles of yellowish brown (10YR 5/6); massive; friable; medium acid.

The A horizon ranges from dark grayish brown to grayish brown and brown in color and from fine sandy loam to loam and silt loam in texture. The B2g horizon is gray, dark gray, or light gray and has common to many mottles in shades of brown and yellow. It is commonly sandy clay loam, silty clay loam, or clay loam and has layers or lenses of coarser material.

Wehadkee soils occur chiefly with Congaree and Chewacla soils. They are wetter than those soils.

Wehadkee soils (Whs).—This undifferentiated group consists of nearly level soils on smooth and, in some places, depressed flood plains of the larger streams. These soils are saturated with water for 3 to 5 months each year and are flooded at least once yearly. The pattern and proportion of soils are not uniform from one area to another. The Wehadkee soils make up about 50 percent of the total acreage; soils similar to the Chewacla soils, 20 percent; and sandier and unclassified soils, the remaining 30 percent.

Wehadkee loam has the profile described as representative of the series, but in places the surface layer is fine sandy loam or silt loam.

Included with these soils in mapping are areas where layers of loamy sand as well as clay have been deposited on the surface by recent floods. Also included are areas that have clayey or sandy underlying layers.

Flooding and wetness limit the use of these soils for crops and pasture. After drainage, however, the soils can be farmed, but the choice of crops is limited. Most of the acreage is in water-tolerant hardwoods, a good use. Capability unit IVw-1; woodland suitability group 1w9.

Wilkes Series

The Wilkes series consists of well-drained, shallow soils that formed in material weathered from a mixture of basic and acid rocks, such as diorite, hornblende schist, and granite. They occur on uplands, mostly adjacent to drainageways, and are widely distributed in Putnam, Baldwin, and Jones Counties. Slopes range from 2 to 25 percent.

In a representative profile, the surface layer is dark grayish-brown sandy loam 2 inches thick. The subsurface layer is yellowish-brown sandy loam 4 inches thick. Beneath this is 4 inches of light olive-brown sandy clay loam. Next is 7 inches of light olive-brown clay that has fine, black mottles. The underlying material, extending to a depth of 45 inches, is partly weathered acid and basic rocks. Intermittent hard rock is at depths of 30 to about 48 inches.

These soils are low in natural fertility and low in organic-matter content. They are strongly acid in the upper part, slightly acid in the middle part, and neutral in the underlying material. Available water capacity is low, and permeability is moderately slow. Tilth is poor.

Wilkes soils are seldom used for crops or pasture, but the smoother, less sloping soils could be farmed. Most of the acreage is in forest. The native vegetation is shortleaf and loblolly pines, cedar, blackjack oak, and post oak and an understory of hawthorn and grasses.

Representative profile of Wilkes sandy loam in an area of Wilkes soils, 10 to 25 percent slopes, 1.5 miles southwest of Gray, on U.S. Highway No. 129, 3.4 miles south on dirt road, and 1 mile southwest on a dirt road, Jones County:

A1—0 to 2 inches, dark grayish-brown (10YR 4/2) sandy loam; weak, fine, granular structure; very friable; common fine roots; strongly acid; abrupt, smooth boundary.

A2—2 to 6 inches, yellowish-brown (10YR 5/4) sandy loam; weak, fine, granular structure; very friable; few small roots; slightly acid; clear, smooth boundary.

B1—6 to 10 inches, light olive-brown (2.5Y 5/4) sandy clay loam; moderate, medium, subangular blocky structure; firm; slightly acid; clear, wavy boundary.

B2t—10 to 17 inches, light olive-brown (2.5Y 5/6) clay; common, fine, distinct, black (5Y 2/2) mottles; moderate, medium, subangular blocky structure; firm; few patchy clay films on ped surfaces; slightly acid; clear, wavy boundary.

C—17 to 45 inches, partly weathered rock with rock form visible; common fine mica; brown streaks in parallel plains; dikes of partly weathered feldspar; neutral.

The A horizon ranges from light yellowish brown to dark grayish brown and is 2 to 10 inches thick. It is typically sandy loam to fine sandy loam. The B2t horizon ranges from yellowish red to olive. It is sandy clay loam, clay loam, or clay. Depth to partly weathered parent material ranges from 10 to 20 inches.

Wilkes soils occur with the Enon, Helena, Vance, and Gwinnett soils. They have a thinner solum than all of those soils. They are less red in the B horizon than Gwinnett and Vance soils.

Wilkes sandy loam, 2 to 10 percent slopes, eroded (WiC2).—This soil is on narrow ridgetops in areas 3 to 40 acres in size. The profile is similar to the one described as representative of the series, but erosion has thinned the surface layer, which is now only 3 or 4 inches thick. In most areas that have been cultivated, some partly weathered rock material has been mixed with the original surface layer. There are a few shallow gullies in places, and most areas have few stones on the surface.

Included with this soil in mapping are a few areas of severely eroded soils that have a plow layer mostly of partly weathered rock material mixed with remnants of the original surface layer and subsoil. This layer varies widely in color and composition. Also included are areas of similar soils that have a combined surface layer and subsoil more than 20 inches thick.

Most of this soil was cultivated in the past but is now in forest. This soil is limited in its suitability for farming because it is shallow and the hazard of erosion is severe if the surface layer is cultivated and not protected. The soil is seldom used for cultivation, and its use for grazing and forest products is limited. Capability unit IVe-4; woodland suitability group 4o1.

Wilkes soils, 10 to 25 percent slopes (WiE).—Soils of this undifferentiated group occur in areas of 5 to 45 acres adjacent to drainageways. The pattern and proportion of soils are not uniform from one area to another. Wilkes soils make up about 50 percent of the total acreage; similar soils that have a thicker subsoil, about 40 percent; and soils that have rock within 20 inches of the surface, the remaining 10 percent.

The Wilkes soil that has the profile described as representative for the series is in this mapping unit, but the surface layer is sandy loam to fine sandy loam. In most areas that have been cultivated, some partly weathered rock material has been mixed into the surface layer.

Included with these soils in mapping are a few areas of severely eroded soils in which the surface layer is mostly partly weathered rock material mixed with subsoil material. Some areas have a few stones on the surface.

Soils of this mapping unit are not suitable for farming. Because of slope, they are subject to erosion if they are cultivated and not protected. The soils are seldom used for pasture, and most of the acreage is in forest, a good use. Capability unit VIIe-2; woodland suitability group 4r2.

Use and Management of the Soils

The soils of Baldwin, Jones, and Putnam Counties are used mainly for forest, but other uses are important. This section discusses the use of soils for woodland, crops and pasture, and wildlife. The properties and features affecting engineering and the limitations affecting town and country planning are listed, mainly in tables.

Interpretations and predictions about soil behavior contained in this publication are based on current knowledge and techniques; thus, good reasoning and judgment must be applied in use of these interpretations because new technology, improved techniques, and economic changes influence alternative uses and management of soils. Changes in the behavior of soils under new and different management techniques are not unusual and should be anticipated.

Because the concepts of many soil series have undergone changes in the last 10 to 20 years, present interpretations and predictions about a particular soil should be studied carefully before applying them to soils of the same name in older published surveys.

Use of the Soils for Woodland[2]

This survey area was originally wooded, and trees now cover about 73 percent of Baldwin, Jones, and Putnam Counties. Good stands of commercial trees are produced in the woodlands (fig. 10) of the counties. Needleleaf forest types occur most commonly on the hills, and broadleaf types generally are dominant on the bottoms along the rivers and creeks.

The commercial value of the wood products is substantial, though it is below its potential. Other values of woodland include grazing, wildlife, recreation, natural beauty, and conservation of soil and water. This section discusses how soils affect the growth and management of trees in the survey area. In table 2, potential productivity as well as hazards and limitations that affect management of the soils for woodland are indicated.

The first column in table 2 gives the woodland suitability group, the map symbols of the soils in each group, and a brief description of the soils. Each group is made up of soils that are suited to the same kinds of trees, that need about the same kind of management to produce these trees, and that have about the same potential productivity.

Each woodland suitability group is identified by a

Figure 10.—A stand of loblolly pine. The soil is Cecil sandy loam, which is in woodland suitability group 3o7.

[2] WILLIAM P. THOMPSON, State forester, Soil Conservation Service, helped prepare this section.

TABLE 2.—*Suitability of the soils for woodland*

[Davidson-Urban land complex, 2 to 10 percent slopes (DyC) and Enon-Urban land complex, 5 to 12 percent slopes (EwD) were not placed in a woodland suitability group, because of their long-term urban use]

Woodland suitability groups and map symbols	Commercially important trees		Hazards and limitations that affect management			Species suitable for commercial planting
	Species	Site class	Erosion hazard	Equipment limitations	Seedling mortality	
Group 1o7. Well-drained soils that have a loamy surface layer and subsoil or underlying layers; on flood plains or in upland depressions; suited to broadleaf or needleleaf trees, or both. Cot, Sen.	Sweetgum Yellow-poplar Loblolly pine	100 105 90	Slight	Slight	Slight	Loblolly pine, slash pine, black walnut[1], sweetgum, and yellow-poplar.
Group 1w8. Somewhat poorly drained and well-drained soils that have a loamy surface layer and subsoil; on flood plains; suited to broadleaf and needleleaf trees, or both. Cst.	Loblolly pine[1] Yellow-poplar Cottonwood Green ash Swamp tupelo	100 100 100 95 80	Slight	Moderate	Moderate	Loblolly pine[2], yellow-poplar, cottonwood, and green ash.
Group 1w9. Poorly drained soils that have a loamy surface layer and subsoil; on flood plains; suited to broadleaf or needleleaf trees, or both. Whs.	Loblolly pine[1] Sweetgum Water oak[1] Green ash Red maple	100 90 85 95 90	Slight	Severe[3]	Severe[2]	Loblolly pine[2], yellow-poplar[2], green ash, and sweetgum.
Group 2o1. Well-drained soils that have a sandy or loamy surface layer and loamy subsoil; on uplands; better suited to southern pines than to other trees. NhA, NhB, NhC, OeB, OeC, OeE, RgB, RhC2.	Loblolly pine Slash pine	90 90	Slight	Slight	Slight	Loblolly pine and slash pine[4].
Group 2s8. Excessively drained soils that have a sandy surface layer and underlying layers; on flood plains; suited to broadleaf or needleleaf trees, or both. Bfs.	Cottonwood Sweetgum Loblolly pine Yellow-poplar	100 90 90 100	Slight	Moderate	Moderate	Cottonwood and loblolly pine.
Group 3o1. Well-drained soils that have a sandy or loamy surface layer and a firm, loamy subsoil; on uplands; better suited to southern pines than to other trees. EgE, VeC.	Loblolly pine Slash pine	80 80	Slight	Slight	Slight	Loblolly pine and slash pine .
Group 3o7. Well-drained soils that have a loamy surface layer and a clayey subsoil; on uplands; better suited to southern pines than to other trees. CyB2, CyC2, DgB2, DgC2, VaB2, VaC2.	Loblolly pine Shortleaf pine	80 70	Slight	Slight	Slight	Loblolly pine.
Group 3c2. Somewhat poorly drained soils that have a loamy surface layer and a clayey subsoil; on uplands; better suited to southern pines than to other trees. SiD.	Loblolly pine Shortleaf pine	80 70	Slight to moderate.	Moderate	Moderate	Loblolly pine and shortleaf pine.
Group 3r8. Well-drained soils that have a loamy surface layer and a clayey subsoil; on uplands; better suited to southern pines than to other trees. CyE2, GgF2, PfE, VaE2.	Loblolly pine Shortleaf pine	80 70	Moderate	Moderate	Slight	Loblolly pine and shortleaf pine.
Group 3x7. Well-drained, cobbly soils that have a loamy surface layer and a clayey subsoil; on uplands; suited to southern pines or broadleaf trees. CAC.	Loblolly pine Shortleaf pine	80 70	Slight	Moderate	Slight	Loblolly pine and shortleaf pine.
Group 3w8. Moderately well drained soils that have a loamy surface layer and a clayey subsoil; on uplands; suited to broadleaf or needleleaf trees, or both. HOC2, HYB2.	Loblolly pine Shortleaf pine Yellow-poplar	80 70 90	Slight to moderate.	Slight	Slight	Loblolly pine, yellow-poplar, and sweetgum.
Group 4o1. Well-drained soils that have a loamy surface layer and clayey or loamy layers in the subsoil; on uplands; better suited to southern pines than to other trees. EjB2, EjC2, WiC2.	Loblolly pine Shortleaf pine Yellow-poplar	70 60 80	Slight	Slight	Slight	Loblolly pine and yellow-poplar.

TABLE 2.—*Suitability of the soils for woodland*—Continued

Woodland suitability groups and map symbols	Commercially important trees		Hazards and limitations that affect management			Species suitable for commercial planting
	Species	Site class	Erosion hazard	Equipment limitations	Seedling mortality	
Group 4c2. Moderately well drained to somewhat poorly drained soils that have a loamy surface layer and a clayey subsoil; very plastic when wet; on uplands; better suited to needleleaf trees than to other trees. IcB.	Loblolly pine Shortleaf pine White oak	70 60 50	Slight	Moderate	Moderate	Loblolly pine and eastern redcedar.
Group 4c2e. Well-drained, eroded soils that have a loamy surface layer that is a mixture of remnants of the original surface layer and the upper part of the subsoil and a clayey subsoil; on uplands; gullied in places; suited to southern pines. CZB2, CZC2, DhC2, VbC2.	Loblolly pine Shortleaf pine	70 60	Moderate	Moderate	Slight	Loblolly pine.
Group 4c3e. Well-drained, eroded, steep soils that have a loamy surface layer that is a mixture of remnants of the original surface layer and subsoil and a clayey subsoil; on uplands; gullied in places; suited to southern pines. CZE2, DhE2.	Loblolly pine Shortleaf pine	70 60	Severe	Severe	Moderate	Loblolly pine.
Group 4s2. Well-drained and excessively drained soils that have about 29 inches of sandy material over a loamy or sandy subsoil that extends to a depth of 86 inches; on uplands; better suited to southern pines than to other trees. AgB, AgC, AhD, AAC, LpC, LpD.	Slash pine Loblolly pine	70 70	Moderate	Moderate	Moderate	Slash pine[4] and loblolly pine.
Group 4r2. Well-drained, shallow soils that have a loamy surface layer and a thin, clayey subsoil; on steep uplands; suited to southern pines. WiE.	Loblolly pine Shortleaf pine	70 60	Moderate	Moderate	Slight	Loblolly pine.

[1] Potential productivity attained only in areas that have adequate surface drainage.
[2] Tree planting is feasible only in areas that have adequate drainage.
[3] Equipment restrictions and seedling mortality are moderate in areas that have adequate drainage.
[4] Suitable only for southern parts of Baldwin and Jones Counties. Ice damage is a hazard in other parts of the survey area.

three-part symbol. The first part of the symbol is a numeral that indicates the relative productivity of the soils: 1 means very high; 2, high; 3, moderately high; and 4, moderate.

The second part of the symbol is a small letter that indicates the important soil property that imposes a moderate or severe hazard or limitation in managing the soils for wood production. The letter *x* shows that the main limitation is stoniness or rockiness; *w* shows that excessive water in or on the soil is the chief limitation; *s* shows that the soils are sandy; *c* shows that clay in the upper part of the soil is a limitation; *r* shows that the soils have steep slopes; and *o* shows that the soils have no significant restrictions or limitations for woodland use or management.

The third element in the symbol is a numeral that indicates the degree of limitations for management and the general suitability of the soils for certain kinds of trees.

The numeral 1 indicates that the soils have no significant limitations and are well suited to needleleaf trees.

The numeral 2 indicates that the soils have one or more moderate limitations and are well suited to needleleaf trees.

The numeral 3 indicates that the soils have one or more severe limitations and are well suited to needleleaf trees.

The numeral 7 indicates that the soils have no significant limitations and are well suited to both needleleaf and broadleaf trees.

The numeral 8 indicates that the soils have one or more moderate limitations and are well suited to needleleaf and broadleaf trees.

The numeral 9 indicates that the soils have one or more severe limitations but are suited to needleleaf and broadleaf trees.

For this survey area, the letter *e* has been used in the symbols 4c2e and 4c3e to designate severely eroded soils that have moderate to severe limitations.

In the second column of table 2 is a list of some of the commercially important trees that are adapted to the soil of each group. These are the trees that woodland managers generally favor in intermediate or improvement cuttings. Also given is the potential productivity of these trees in terms of site class. The site class is the average height of dominant trees, in feet, at age 30 for cottonwood, at age 35 for sycamore, at age 25 for planted pines, and at age 50 for all other species or types.

The management concerns evaluated in the next column are erosion hazard, equipment limitations, and seedling mortality. Erosion hazard measures the risk of soil loss in well-managed woodland. Erosion hazard is *slight* if expected soil loss is small, *moderate* if some measures to control erosion are needed in logging and construction, and *severe* if intensive treatment or special equipment methods are needed to prevent excessive soil loss.

Equipment limitations reflect the soil conditions that restrict the use of equipment normally used in woodland management or harvesting. They are *slight* if use is not limited to kind of equipment or time of year. *Moderate* indicates a seasonal limitation or a need for modification in methods or equipment. *Severe* indicates the need for specialized equipment or operations.

Seedling mortality indicates the degree of expected survival of planted seedlings when plant competition is not a limiting factor. Normal rainfall, good planting stock, and proper planting are assumed. Seedling mortality is slight if the expected survival is more than 75 percent, moderate if 50 to 75 percent survive; and severe if less than 50 percent survive.

In the last column is a list of trees suitable for commercial planting.

Use of the Soils for Cultivated Crops and Pasture[3]

This section explains the system of capability classification used by the Soil Conservation Service. It also describes management practices that are suitable for groups of soils having similar properties, limitations to use, and management requirements. Also given are estimated yields of principal crops and pasture plants grown in the survey area under a high level of management.

Capability grouping

Capability grouping shows, in a general way, the suitability of soils for most kinds of field crops. The soils are grouped according to the limitations of the soils when used for field crops, the risk of damage when they are used, and the way they respond to treatment. The grouping does not take into account major and generally expensive landforming that would change slope, depth, or other characteristics of the soils; does not take into consideration possible but unlikely major reclamation projects; and does not apply to rice, cranberries, horticultural crops, or other crops requiring special management.

[3] JAMES N. NASH, conservation agronomist, Soil Conservation Service, helped prepare this section.

Those familiar with the capability classification can infer from it much about the behavior of soils when used for other purposes, but this classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for range, forest trees, or engineering.

In the capability system, the kinds of soil are grouped at three levels: the capability class, subclass, and unit. These are discussed in the following paragraphs.

CAPABILITY CLASSES, the broadest groups, are designated by Roman numerals I through VIII. The numerals indicate progressively greater limitations and narrower choices for practical use, defined as follows:

Class I soils have few limitations that restrict their use.

Class II soils have moderate limitations that reduce the choice of plants or that require moderate conservation practices.

Class III soils have severe limitations that reduce the choice of plants, require special conservation practices, or both.

Class IV soils have very severe limitations that reduce the choice of plants, require very careful management, or both.

Class V soils are not likely to erode but have other limitations, impractical to remove, that limit their use largely to pasture, woodland, or wildlife habitat. (None in this survey area.)

Class VI soils have severe limitations that make them generally unsuited to cultivation and limit their use largely to pasture, woodland, or wildlife habitat.

Class VII soils have very severe limitations that make them unsuited to cultivation and that restrict their use largely to pasture, woodland, or wildlife habitat.

Class VIII soils and landforms have limitations that preclude their use for commercial plants and restrict their use to recreation, wildlife habitat, water supply, or to esthetic purposes. (None in this survey area.)

CAPABILITY SUBCLASSES are soil groups within one class; they are designated by adding a small letter, *e*, *w*, *s*, or *c*, to the class numeral, for example, IIe. The letter *e* shows that the main limitation is risk of erosion unless close-growing plant cover is maintained; *w* shows that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); *s* shows that the soil is limited mainly because it is shallow, droughty, or stony; and *c*, used in only some parts of the United States, but not in Baldwin, Jones, and Putnam Counties, shows that the chief limitation is climate that is too cold or too dry.

In class I there are no subclasses, because the soils of this class have few limitations. Class V can contain, at the most, only the subclasses indicated by *w*, *s*, and *c*, because the soils in class V are subject to little or no erosion, though they have other limitations that restrict their use largely to pasture, range, woodland, wildlife, or recreation.

CAPABILITY UNITS are soil groups within the subclasses. The soils in one capability unit are enough alike to be suited to the same crops and pasture plants, to require similar management, and to have similar productivity and other responses to management. Thus, the capability unit is a convenient grouping for making many statements about man-

agement of soils. Capability units are generally designated by adding an Arabic numeral to the subclass symbol, for example, IIIe-1. Thus, in one symbol, the Roman numeral designates the capability class, or degree of limitation; the small letter indicates the subclass, or kind of limitation, as defined in the foregoing paragraph; and the Arabic numeral specifically identifies the capability unit within each subclass.

Management by capability units

The soils in Baldwin, Jones, and Putnam Counties are grouped into 27 capability units. The soils in each unit have about the same limitations and susceptibility to damage, need about the same management, and respond to management in about the same way.

The soils in capability unit I-1 have only slight limitations. Any suitable crop can be grown continuously if enough plant residue is returned to maintain good tilth. A planned sequence of crops helps to control weeds, insects, and plant diseases and results in the more efficient use of fertilizer. Lime and fertilizer should be applied regularly according to plant needs as indicated by soil tests.

Excess water is the main hazard of the soils in subclasses IIw, IIIw, and IVw. To insure maximum efficiency of these soils, some drainage may be needed. Drainage needed depends on the extent of the wetness and the crop to be grown. If drainage is required, a system of mains and laterals should be designed and installed. These are of two types: open ditches and covered tile drains.

After the water problem is solved, any suitable crop can be grown each year if enough plant residue is returned to the soil to maintain good tilth. A planned sequence of crops aids in the control of weeds, insects, and plant diseases and results in the more efficient use of fertilizer. Fertility can be maintained by regular applications of lime and fertilizer, made according to plant needs and indicated by soil testing.

The principal need for the soils in subclasses IIIs and IVs is the return of plant residues to the soil in frequent and large amounts to improve the available water capacity and fertility. Cropping sequences that include perennial grasses or legumes are most beneficial. Special arrangement of crops and good management of annual crop residues are also helpful.

Erosion is the dominant hazard on the soils in subclasses IIe, IIIe, and IVe. Where the soils are cultivated, generally the farmer can help to control erosion by cultivating on the contour with or without terraces or with stripcropping, depending on the crops grown and the degree of the limitation.

Several management practices contribute to maintenance of soil productivity and good tilth and help to check soil losses. Among these are regular applications of lime and fertilizer according to plant needs, as indicated by soil testing; good management of crop residue, generally by shredding and leaving the residue on the surface between seasons of crop growth; and use of a suitable cropping system.

The soils should be managed so that soil losses from erosion are within allowable limits. The steepness and length of slopes or the erosion control practices installed govern the cropping system needed in the control of erosion.

Complementary practices beneficial to the soils in all capability units are as follows:

1. Grassed waterways or outlets are essential for the disposal of runoff water from straight-row farming, contour farming, terraces, or stripcropping.
2. A field border of perennial grass is needed to control erosion in some places at the edge of fields and to reduce weed growth. Such a border is attractive and allows more efficient operation of farm equipment.
3. Farm roads and fences should be located on the crest of the slopes, where the watershed divides, or on the contour. They should permit field and row arrangement that facilitates efficient farming operations. Fences may be located in or adjacent to natural waterways.

In the following pages the capability units in Baldwin, Jones, and Putnam Counties are described and suggestions for the use and management of the soil are given.

Capability units are numbered according to a statewide system; therefore, the numbers are not necessarily consecutive. It is also necessary to separate capability units of the same number that make up soils from different major land resource areas; thus, a *(C)* is used to denote Coastal Plain soils. The names of soil series represented in a capability unit are named in the description of the capability unit, but this does not mean that all the soils of a given series appear in the unit. Refer to the "Guide to Mapping Units" at the back of this survey to learn the names of all of the soils in anv given unit.

CAPABILITY UNIT I-1

Starr and Toccoa soils is the only mapping unit in this unit. These well-drained soils are in upland depressions at the head of drainageways. They are covered with a mantle of recent alluvium. They have a loamy or sandy surface layer, 4 to 19 inches thick, that is underlain by loamy to sandy layers. Slopes are 0 to 2 percent.

These soils have a thick root zone. Tilth is good. The soils are low in organic-matter content and are strongly acid to slightly acid in the upper part and strongly acid to neutral in the lower part. Available water capacity is medium to high, and permeability is moderately rapid. These soils are subject to shallow flooding that is less frequent than once in 5 years.

The soils in this unit are suited to all crops grown locally, including grasses and legumes. They are well suited to truck crops and can be cultivated intensively.

These soils are in small areas surrounded by soils that require more intensive management in order to control erosion.

CAPABILITY UNIT I-1(C)

Norfolk loamy sand, 0 to 2 percent slopes, is the only soil in this unit. It is well drained and occurs on

broad, nearly level landscapes. Typically, the surface layer is loamy sand about 10 inches thick. It is underlain by sandy loam and sandy clay loam.

This soil has a thick root zone. Tilth is good. The soil is low in organic-matter content and is strongly acid throughout. Permeability is moderate, and available water capacity is medium. Erosion is generally not a hazard.

Any suitable crop can be grown year after year if enough plant residue is returned to the soil to maintain good tilth (fig. 11). A planned sequence of crops aids in the control of weeds, insects, and plant diseases and results in the more efficient use of fertilizer. Lime and fertilizer should be applied regularly, according to plant needs.

CAPABILITY UNIT IIe-1

This unit consists of well-drained, eroded soils on smooth uplands. These soils are in the Cecil and Davidson series. They have a surface layer of loam or sandy loam 6 to 8 inches thick. They are underlain by sandy clay loam, clay loam or clay. Slopes range from 2 to 6 percent.

Soils in this unit have a thick root zone. Tilth is generally good. Organic-matter content is low, and reaction is strongly acid in the surface layer to medium acid or strongly acid in the lower part. Permeability is moderate, and available water capacity is medium. Runoff is medium, and the hazard of erosion is moderate in cultivated fields.

These soils are suited to all crops grown locally, including grasses and legumes. The crops are easy to establish and to maintain, and they respond if fertilizer is applied. Clean-cultivated crops should not be grown continuously, for there is a hazard of further erosion. The soils are well suited to sprinkler irrigation.

These soils can be cultivated intensively if terraces or other erosion control measures are used or if the cropping system includes good management, such as minimum tillage or a no-tillage system. For example, a suitable system on a slope of 4 percent that is 200 feet long is corn for silage planted by the no-tillage system each year and followed by a winter cover, such as small grain.

CAPABILITY UNIT IIe-1(C)

This unit consists of well-drained soils on smooth uplands. These soils are in the Norfolk, Orangeburg, and Red Bay series. They have a surface layer of loamy sand, 6 to 10 inches thick, and a loamy subsoil. Slopes range from 2 to 6 percent.

These soils have a thick root zone. Tilth is good, but the organic-matter content is low. The soils are strongly acid or very strongly acid throughout. Permeability is moderate, and available water capacity is medium. Runoff is medium, and the hazard of erosion is slight to moderate in cultivated fields.

The soils in this unit are suited to all locally grown crops. They are better suited to the warm-season perennial grasses, such as bermudagrass and bahiagrass, than to the cool-season grasses, such as fescue and orchardgrass.

Where these soils are cultivated, soil losses can be

Figure 11.—Field of soybeans. The soil is Norfolk loamy sand, 0 to 2 percent slopes, which is in capability unit I-1(C).

held within allowable limits by a combination of erosion control measures and a cropping system that includes either close-growing annuals or crops that produce a large amount of residue. For example, a suitable cropping system on a slope of 4 percent that is 200 feet long is small grain, soybeans, and a row crop, such as cotton, planted in alternate strips on the contour. The crops should be planted by the no-tillage system and rotated each year.

CAPABILITY UNIT IIe-3

This unit consists of slowly permeable, well drained and moderately well drained, eroded soils on smooth uplands. These soils are in the Enon, Helena, and Vance series. The surface layer is loamy and about 3 to 10 inches thick. It is underlain by clay. Slopes range from 2 to 6 percent.

These soils have a moderately thick root zone. Tilth is good to fair, and organic-matter content is low. These soils are slightly acid to strongly acid in the upper part and strongly acid to neutral in the lower part. Permeability is slow, and available water capacity is medium. Runoff is medium, and the hazard of erosion is moderate in cultivated fields and bare areas.

These soils are suited to most locally grown crops, and they respond well if fertilizer is applied. They are also well suited to permanent pasture grasses and temporary grazing crops if properly managed to maintain good ground cover.

If these soils are cultivated, soil losses are held within allowable limits by using a combination of practices that control erosion and a cropping system that includes close-growing annuals or crops that produce large amounts of residue. An example of a suitable cropping system is corn grown year after year, using the no-tillage system, where only the grain is harvested. After the harvest, the crop residue should be left uniformly spread over the surface.

CAPABILITY UNIT IIe-4

Iredell loam, 2 to 6 percent slopes, is the only soil in this unit. It is moderately well drained to somewhat poorly drained and is on smooth uplands. Typically, the surface layer is loam 3 to 7 inches thick. Below this is a layer of clay that is hard when dry and plastic when wet.

This soil has a moderately thick root zone. Tilth is fair, and organic-matter content is low. Permeability is slow, and available water capacity is medium. Runoff is rapid on bare, unprotected fields, and the hazard of erosion is moderate. The clayey subsoil limits root growth. Cultivation at the optimum moisture content, which prevents clodding and maintains fair tilth, is limited to short periods.

This soil is fairly well suited to most locally grown crops. It is better suited, however, to hay and pasture plants, such as bermudagrass, fescue, lespedeza, and clover. Suitable crops respond fairly well if adequate fertilizer is applied. Spring planting is often delayed because the soil is somewhat slow to warm up.

If this soil is needed for cultivated crops, runoff can be slowed and erosion controlled by using some of the following practices: contour tillage, including adequately managed close-growing crops in the cropping system, a minimum tillage or no-tillage system, stripcropping, or terracing. An example of a suitable system is cotton, small grain, and soybeans planted in alternate strips on the contour. Small grain and soybeans are to be planted by the no-tillage system.

CAPABILITY UNIT IIw-1

Only Congaree and Toccoa soils are in this unit. These soils are well drained. They occur on first bottoms and are subject to flooding in winter and spring. The surface layer is loamy sand to silt loam about 5 to 18 inches thick. The layers below are mostly loamy but in places are stratified with sandy layers. Slopes range from 0 to 2 percent.

These soils have a thick root zone. Tilth is good, but the organic-matter content is low. These soils are strongly acid to slightly acid in the upper part and strongly acid to neutral in the lower part. Permeability is moderate in Congaree soils and moderately rapid in Toccoa soils. Available water capacity is medium. Flooding occurs at least once a year for only a short period in winter or early in spring.

Excess water is the main limitation to the use of these soils for crops. To insure maximum efficiency, some drainage may be needed, but the type of water management depends on the crop to be grown. If drainage is needed, a system of main and lateral ditches can be designed and installed. Either open ditches or covered tile drains are suitable.

After the water problem is solved, corn or any other suitable crop can be grown year after year if enough plant residue is returned to the soil to maintain good tilth. A planned sequence of crops helps to control weeds, insects, and plant diseases, and results in the more efficient use of fertilizer. Fertility can be maintained by making regular applications of lime and fertilizer according to plant needs.

CAPABILITY UNIT IIIe-1

This unit consists of well-drained, eroded soils in the Cecil and Davidson series. These soils have a surface layer of sandy loam, loam, or sandy clay loam 4 to 8 inches thick. This layer is underlain by layers of sandy clay loam, clay loam, or clay. Slopes range from 2 to 10 percent.

These soils have a thick root zone. Tilth is good, except in Cecil sandy clay loam, 2 to 6 percent slopes, eroded. This soil is in poor to fair tilth because part of the subsoil has been mixed with remnants of the original surface layer. This soil can be worked only within a narrow range of moisture content without clodding. Davidson soils are sticky when wet and tend to cling to farm implements. Soils of this unit are low in organic-matter content and are strongly acid in the upper part and strongly acid to medium acid in the lower part. Permeability is moderate, and available water capacity is me-

dium. Erosion is a hazard in cultivated fields and bare areas.

The soils in this unit are suited to all locally grown crops, including grasses and legumes.

Management practices that help to reduce erosion are contour tillage, terracing, stripcropping, and minimum- or no-tillage systems. The erosion control measure needed depends on the kind of cropping system. For example, a suitable cropping system on a terraced slope of 5 percent is a 2-year rotation of corn for silage followed by small grain.

CAPABILITY UNIT IIIe-1(C)

This unit consists of well-drained, gently sloping soils on uplands. These soils are in the Norfolk, Orangeburg, and Red Bay series. They have a surface layer of loamy sand or sandy loam, 4 to 10 inches thick, underlain by sandy loam or sandy clay loam. Slopes range from 6 to 10 percent.

These soils have a thick root zone. Tilth is good, but the organic-matter content is low. These soils are strongly acid to very strongly acid throughout. Permeability is moderate, and available water capacity is medium. Runoff is medium to rapid, and the hazard of erosion is moderate to severe in cultivated fields or in bare areas.

These soils are suited to all the locally grown crops. They are better suited to warm-season perennial grasses, such as bermudagrass and bahiagrass, than to cool-season grasses, such as fescue and orchardgrass.

Where these soils are cultivated, a combination of erosion control measures used with a cropping system that includes either close-growing annuals or crops that produce a large amount of residue is needed to hold soil losses within allowable limits. An example of such a system on a terraced slope of 5 percent is a 2-year rotation consisting of 1 year of a row crop, such as cotton, followed by 1 year of a row crop, such as corn, using the no-tillage system.

CAPABILITY UNIT IIIe-3

This unit consists of slowly permeable, well-drained, eroded soils that have gentle slopes. These soils are in the Enon and Vance series. They have a surface layer of sandy loam to sandy clay loam, 4 to 7 inches thick, and clayey layers below. Slopes range from 6 to 10 percent.

These soils have a moderately thick root zone. Tilth is good to fair, and the organic-matter content is low. These soils are slightly acid to strongly acid in the upper part and strongly acid to neutral in the lower part. Permeability is slow, and available water capacity is medium. Runoff is medium to rapid, and the hazard of erosion is severe in cultivated fields or in bare areas.

The soils in this unit are suited to most locally grown crops, and they respond well to fertilizer. They are suited to permanent pasture grasses and temporary grazing crops if they are properly managed to maintain good ground cover.

If these soils are cultivated, soil losses can be held within allowable limits by using a combination of practices that control erosion. Among these measures is a cropping system that includes either close-growing annuals or crops that produce a large amount of residue. An example of a suitable cropping system on a slope of 6 percent that is 150 feet long is continuous double-cropped small grain and grain sorghum planted on the contour by using the no-tillage system.

CAPABILITY UNIT IIIe-4

Vaucluse loamy sand, 2 to 10 percent slopes, is the only soil in this unit. This soil has a surface layer of loamy sand about 3 to 8 inches thick. It is underlain by layers of sandy loam and sandy clay loam that are slightly cemented at a depth of about 27 inches.

This soil has a moderately thick root zone. Tilth is generally good, but the organic-matter content is low. Erosion is the chief hazard if the soil is farmed. Permeability is slow, and available water capacity is low. Erosion is the chief hazard if the soil is farmed.

This soil is poorly suited to cotton and is only moderately well suited or marginal for other crops grown locally. It is better suited to perennial lespedeza, bermudagrass, or pine trees than to other plants.

Where the soil is used for row crops, it should be managed carefully. A complete water-disposal system is needed, including terraces, stripcropping, or minimum tillage. An example of a suitable cropping system is corn grown year after year, using the no-tillage system. The residue should be mowed and left uniformly spread on the surface.

CAPABILITY UNIT IIIw-1

Chewacla and Starr soils is the only mapping unit in this unit. These soils are somewhat poorly drained to well drained. They occur on first bottoms and are subject to frequent flooding. The surface layer ranges from silty clay loam to sandy loam and is about 7 inches thick. It is underlain by layers of silty clay loam, silt loam, sandy clay loam, and clay. Slopes range from 0 to 2 percent.

These soils have a thick root zone. Tilth is good, and organic-matter content is medium to low. Reaction is medium acid to strongly acid throughout. Permeability is moderate in Chewacla soils and moderately rapid in Starr soils. Available water capacity is medium to high. Flooding and the high water table somewhat limit the use of these soils.

Excess water is the main limitation to the use of these soils for farming. To insure maximum efficiency, some drainage may be needed, but the type of water management depends on the crop to be grown. If drainage is needed, a system of main and lateral ditches can be designed and installed. Either open ditches or covered tile drains are suitable.

After the water problem is solved, any suitable crop can be grown year after year if enough plant residue is returned to the soil to maintain good tilth and if enough fertilizer is added for crops. A planned sequence of crops helps to control weeds, insects, and plant diseases and results in the more efficient use of fertilizer. Fertility can be maintained by making regular applications of lime according to plant needs.

CAPABILITY UNIT IIIs-1

Buncombe loamy sand is the only soil in this unit. This soil is excessively drained and occurs on first bottoms. It has a surface layer of loamy sand about 6 inches thick. The underlying layers are loamy sand and sandy loam. Slopes range from 0 to 4 percent.

This soil has a thick root zone, but droughtiness somewhat limits root growth. Tilth is good, but the organic-matter content is low. Reaction is very strongly acid throughout. Permeability is rapid, and available water capacity is low. Runoff is slow. Flooding occurs once or twice a year, usually in winter or spring.

This soil is suited to most locally grown crops, but it is not well suited to cotton, clover, or annual lespedeza. It is better suited to warm-season perennials, such as sericea, bermudagrass, or bahiagrass, than to the cool-season perennials, such as fescue or orchardgrass.

Erosion is not a hazard on this soil. The principal need is that plant residues be returned to the soil in frequent and large amounts to improve the available water capacity and fertility. An example of a cropping system that can do this is one in which corn is grown each year and fertilizer is applied according to plant needs. The success of this system depends on harvesting only the grain and leaving all the crop residues and aftermath on the surface between seasons of crop growth.

CAPABILITY UNIT IIIs-2

Ailey loamy sand, 2 to 6 percent slopes, is the only soil in this unit. This soil is well drained. It has a surface layer of loamy sand, 5 inches thick, and a subsurface layer about 24 inches thick. The material below this is loamy and, at a depth of about 48 inches, is firm, cemented, and brittle. Slopes range from 2 to 6 percent.

This soil has a thick root zone. Tilth is good, but the organic-matter content is low. Reaction is strongly acid throughout. Permeability is slow in the fragipan, and available water capacity is low. Droughtiness is the chief concern, although the hazard of erosion is moderate.

This soil is moderately well suited to most locally grown crops, but cotton is not commonly grown. Bermudagrass, bahiagrass, and sericea lespedeza are suitable pasture plants.

The principal need for this soil is that frequent and large amounts of plant residue are returned to the soil to improve its available water capacity and fertility. No erosion control measures are required if a heavy duty cropping system is used.

An example of a cropping system that controls erosion and maintains tilth is 1 to 2 successive years of a suitable row crop followed by 2 to 4 successive years of perennial grass. These crops need liberal applications of fertilizer.

CAPABILITY UNIT IVe-1

This unit consists of well-drained, eroded soils that have gentle slopes. These soils are in the Cecil and Davidson series. They have a surface layer of clay loam or sandy clay loam, 4 to 8 inches thick, and clayey layers below. Slopes range from 6 to 10 percent.

These soils have a thick root zone. Tilth is generally poor in all the soils in this unit, and tillage without clodding is difficult, except within a fairly narrow range of moisture content. Organic-matter content is low. Cecil soils are strongly acid throughout, and Davidson soils are strongly acid in the upper part and medium acid in the lower part. Permeability is moderate, and available water capacity is medium. Runoff is rapid, and the hazard of erosion is severe in cultivated fields unless the soil is protected.

Most of the original surface layer has been lost from these soils through erosion and previous management. This erosion limits the choice of plants and increases the number of practices needed to control erosion where these soils are cultivated. A heavy duty cropping system using straight rows, contour rows, or stripcropping, generally is more desirable than other cropping systems. An example of a suitable cropping system is a grass, such as tall fescue, for 2 or more years followed by a row crop, such as corn, for 1 year.

CAPABILITY UNIT IVe-3

This unit consists of moderately well drained and well drained, gently sloping, eroded soils in the Helena and Vance series. These soils have a surface layer mainly of sandy clay loam 2 to 5 inches thick, but in places the surface layer is sandy loam. The underlying layers are clayey. Slopes range from 2 to 10 percent.

These soils have a thick root zone. Tilth is generally poor because some of the subsoil has been mixed with remnants of the original surface layer. The soils can be worked without clodding only within a narrow range of moisture content. Organic-matter content is low, and reaction is strongly acid throughout. Permeability is slow, and available water capacity is medium. Runoff is rapid, and the hazard of erosion is very severe if the soils are cultivated and not protected.

These soils are better suited to corn than to most other row crops grown locally. They are better suited to summer perennials, such as sericea lespedeza, bermudagrass, and bahiagrass, than to other crops. Where the soils are needed for row crops, a heavy duty cropping system should be used. An example of a suitable cropping system is 2 or more years of grass followed by 1 year of corn.

CAPABILITY UNIT IVe-4

Wilkes sandy loam, 2 to 10 percent slopes, eroded, is the only soil in this unit. This soil is well drained and shallow. It occurs mainly on ridgetops. It has a surface layer of sandy loam about 3 to 4 inches thick. Beneath this is a thin layer of clayey material that is underlain by weathered rock.

This soil has a shallow root zone. Tilth is generally poor, and organic-matter content is low. Reaction is strongly acid in the upper part, slightly acid in the middle part, and neutral in the underlying

material. Permeability is moderately slow, and available water capacity is low. Runoff is rapid, and the hazard of erosion is severe if the soil is cultivated and not protected.

This soil is only moderately well suited to locally grown crops. It is better suited to warm-season perennials, such as sericea lespedeza and bermudagrass, than to other crops. Where the soil is needed for row crops, it can be used occasionally under careful management. Row crops should not be grown more than 2 successive years in a rotation. An example of a suitable cropping system is 4 or more years of grass followed by 2 years of a suitable row crop.

CAPABILITY UNIT IVs-1

Cecil cobbly sandy loam, 2 to 10 percent slopes, is the only soil in this unit. This soil is well drained. It has a surface layer of sandy loam, 4 to 7 inches thick, that is made up partly of quartz cobblestones 3 to 10 inches in diameter. It is underlain by layers of clay, clay loam, or sandy clay loam.

This soil has a thick root zone. Organic-matter content is low, and reaction is strongly acid throughout. Permeability is moderate, and available water capacity is medium. The hazard of erosion is slight to moderate if the soil is cleared and not protected.

This soil would be suited to locally grown crops, but the coarse fragments interfere with tillage. For this reason, a no-tillage system is more desirable than any other system of tillage. Some surface fragments have to be removed before any satisfactory cultivation can be done. An example of a suitable cropping system is 2 years of corn followed by 1 year of soybeans. Both of these crops should be planted by a no-tillage system.

CAPABILITY UNIT IVs-2

This unit consists of well-drained to excessively drained soils in the Ailey, Lakeland, and Norfolk series. The Ailey and Norfolk soils have a sandy surface layer and loamy layers below. The Lakeland soils, however, are sandy to a depth of 80 inches or more. Slopes range from 2 to 10 percent.

The soils in this unit have a thick root zone. Tilth is good, but the organic-matter content is low. Reaction is strongly acid throughout. Permeability is rapid in the Lakeland soils, moderate in the Norfolk soils, and slow in the Ailey soils. Available water capacity is low in the Ailey soils, very low in the Lakeland soils, and medium in the Norfolk soils.

Because of slope and droughtiness, these soils are generally poorly suited to cultivated crops, but they can be farmed. They are better suited to trees than to other crops, although satisfactory response can be obtained from pasture. If the soils are used for pasture, bahiagrass and Coastal bermudagrass are suitable plants. Liberal applications of fertilizer are needed, but applications should be smaller and more frequent than on soils that contain more silt and clay.

An example of a suitable cropping system is one in which corn is grown year after year, only the grain is harvested, and crop residues are left on the surface between seasons of crop growth.

CAPABILITY UNIT IVw-1

Wehadkee soils is the only mapping unit in this unit. These soils are poorly drained. They occur on first bottoms and are subject to frequent flooding. The surface layer ranges from silt loam to fine sandy loam and is about 5 to 9 inches thick. It is underlain by layers of clay loam, sandy clay loam, silty clay loam, or clay loam. Slopes range from 0 to 2 percent.

These soils have a thick root zone. Tilth is good if the soils are drained, and organic-matter content is medium. Reaction is medium acid to slightly acid throughout. Permeability is moderate, and available water capacity is medium. Flooding and the high water table for 3 or 5 months each year limit the use of these soils.

Wehadkee soils are better suited to pasture than to cultivated crops because of wetness. Excess water is the main concern, and drainage may be needed. Water management depends on the crop or pasture plant to be grown. A system of main and lateral ditches, either open ditches or covered tile drains, may be designed and installed.

After the water problem is solved, any suitable crop can be grown if enough plant residue is returned to the soil to maintain good tilth. A planned sequence of crops helps to control weeds, insects, and plant diseases and results in more efficient use of fertilizer. Fertility can be maintained by regular applications of lime and fertilizer made according to plant needs.

CAPABILITY UNIT VIe-1

This unit consists of well-drained, moderately steep to steep soils in the Cecil, Davidson, Pacolet, and Vance series. Except for the Pacolet soils, all the soils in the unit are eroded. They have a surface layer of sandy loam, sandy clay loam, or clay loam 4 to 10 inches thick. Beneath this are layers of sandy clay loam, clay loam, or clay. Slopes range from 10 to 25 percent.

The soils in this unit have a thick to moderately thick root zone. Tilth is generally good, except in eroded areas where some of the subsoil has been mixed with remnants of the original surface layer. In these areas the present surface layer can be worked only within a narrow range of moisture content without clodding. The organic-matter content is low, and reaction is medium acid to strongly acid throughout. Permeability is generally moderate but is slow in the Vance soils. The available water capacity is medium. Runoff is rapid in cultivated or bare fields unless the fields are protected by erosion control measures.

Because the soils in this unit are moderately steep to steep and are highly susceptible to erosion, they are not generally suitable for cultivation. They are suited to deep-rooted perennials and trees. All the locally grown grasses and legumes are suited, and good pastures can be established and maintained if management is good.

In establishing or renovating pastures, less erosion will occur if planting is done in alternate contour strips over a period of a few years. Liberal amounts of fertilizer should be applied each year, and lime every 3 to 5 years.

CAPABILITY UNIT VIe-1(C)

Orangeburg loamy sand, 10 to 20 percent slopes, is the only soil in this unit. This soil is well drained and occurs on sloping hillsides. The surface layer is loamy sand about 6 inches thick. It is underlain by sandy loam and sandy clay loam.

This soil has a thick root zone. Tilth is good, but the organic-matter content is low. This soil is very strongly acid to strongly acid throughout. Permeability is moderate, and available water capacity is medium. Runoff is rapid, and the hazard of erosion is severe in unprotected bare areas.

Because this soil is moderately steep and subject to much erosion if cleared, it is not generally suitable for cultivation. It is suited to deep-rooted perennial pasture plants and pine trees as well as to most of the locally grown pasture grasses and legumes. Pasture stands can be established and maintained if reasonable care is used. Renovating and establishing pasture in parallel contour strips helps in controlling soil losses. Liberal amounts of fertilizer should be applied each year, and lime should be applied every 3 to 4 years.

CAPABILITY UNIT VIe-2

Susquehanna fine sandy loam, 5 to 15 percent slopes, is the only soil in this unit. This soil occurs on side slopes and ridgetops and is somewhat poorly drained. The surface layer is fine sandy loam about 2 to 5 inches thick. The underlying layers are clayey and very plastic when wet.

This soil has a moderately thick root zone, but the clayey layers limit root penetration. Tilth is generally poor, and organic-matter content is low. This soil is very strongly acid throughout. Permeability is very slow, and available water capacity is high. Runoff is rapid if the surface is bare and not protected by erosion control measures.

This soil is not suited to cultivated crops, because of slope and the clayey layers below the surface layer. It is generally poorly suited to pasture, but bahiagrass and similar grasses respond fairly well under careful management. This soil is better suited to pine trees than to other crops.

CAPABILITY UNIT VIs-1

Lakeland sand, 10 to 15 percent slopes, is the only soil in this unit. This soil is excessively drained and occurs on strongly sloping to steep uplands. The surface layer is sand about 6 inches thick. The underlying layers are also sand.

This soil has a thick root zone. Tilth is good, but the organic-matter content is low. This soil is strongly acid throughout. Permeability is rapid, and available water capacity is very low. The chief limitations are droughtiness and slope.

Because of slope and droughtiness, this soil is not generally suited to cultivated crops. It is better suited to trees, although satisfactory response can be obtained from pasture. If the soil is used for pasture, bahiagrass or bermudagrass is suitable.

Liberal applications of fertilizer are needed, but in smaller and more frequent applications than on soils that contain more silt and clay.

CAPABILITY UNIT VIIe-1

Gwinnett loam, 15 to 35 percent slopes, eroded, is the only soil in this unit. This soil is well drained. The surface layer is loam, 2 to 6 inches thick, and is underlain by layers of clay or clay loam.

This soil has a thick to moderately thick root zone. Tilth is generally good, but the organic-matter content is low. This soil is strongly acid to medium acid throughout. Permeability is moderate, and available water capacity is medium. Runoff from unprotected bare surfaces is rapid, and the hazard of erosion is very severe.

Because of steepness and the severe hazard of erosion, this soil is not suited to cultivated crops. It is better suited to pine trees, but a fair pasture of fescue can be grown in the less steep areas, with careful management.

CAPABILITY UNIT VIIe-2

Only Wilkes soils, 10 to 25 percent slopes, are in this unit. These soils are well drained and are on uplands. The surface layer is sandy loam or fine sandy loam 2 to 5 inches thick. It is underlain by thin, clayey layers.

These soils have a shallow root zone. Tilth is poor, and the organic-matter content is low. Reaction ranges from strongly acid in the upper part to neutral in the lower part. Permeability is moderately slow, and the available water capacity is low. Runoff is rapid if the surface is left unprotected.

Soils in this unit are not suited to cultivated crops and are poorly suited to perennial grasses. Common bermudagrass, bahiagrass, or sericea lespedeza can be grown for pasture, but grazing should be limited. The soils are better suited to trees than to other crops.

CAPABILITY UNIT VIIe-3

This unit consists of well drained to moderately well drained soils that have firm or cemented and brittle layers below the surface layer. These soils are in the Ailey and Esto series. The surface layer is loamy sand and ranges from about 2 to 9 inches in thickness. The Ailey soils have a subsurface layer of loamy sand about 24 inches thick. The underlying layers are loamy, and some are cemented and brittle. These layers inhibit root penetration. Slopes range from 10 to 25 percent.

The soils in this unit have a thick to moderately thick root zone. Tilth is good, but the organic-matter content is low. These soils are strongly acid to very strongly acid throughout. Permeability is slow, and available water capacity is medium to low. Runoff is rapid on bare, unprotected surfaces, and the hazard of erosion is very severe.

These soils are not suited to cultivated crops or pasture. They are better suited to pine trees, but the lesser slopes can be used for limited grazing.

Suitable plants are bahiagrass, bermudagrass, and sericea lespedeza.

Estimated yields

Table 3 lists estimated yields of the principal crops grown in the three counties. The predictions are based on estimates made by farmers, soil scientists, and others who have knowledge of yields in the counties and on information taken from research data. The estimated yields are average yields per acre that can be expected by good commercial farmers who use a high level of management.

Crops other than those shown in table 3 are grown in the county, but their estimated yields are not included, because the acreage is small or reliable data on yields are not available.

The estimated yields given in table 3 can be expected if the following general management practices are used:

1. Rainfall is effectively used and conserved.
2. Surface or subsurface drainage systems, or both, are installed.
3. Crop residue is managed to maintain favorable tilth.
4. Minimum but timely tillage is used.
5. Measures that control insects, plant diseases, and weeds are consistently used.

TABLE 3.—*Estimated yields per acre of principal crops under a high level of management*

[Absence of a figure indicates that the crop is not commonly grown on the soil specified. Davidson-Urban land complex, 2 to 10 percent slopes, (DyC) and Enon-Urban land complex, 5 to 12 percent slopes, (EwD) were not included, because of their long-term urban use]

Soil	Corn	Cotton	Oats	Fescue-legumes	Coastal bermudagrass
	Bu	*Lb*	*Bu*	*AUM*[1]	*Tons*
Ailey loamy sand, 2 to 6 percent slopes	50	325	45	4.3	3.5
Ailey loamy sand, 6 to 10 percent slopes				4.0	2.5
Ailey soils, 10 to 15 percent slopes					3.5
Ailey and Norfolk loamy sands, 2 to 10 percent slopes	60	415	45	4.5	4.5
Buncombe loamy sand	60		55		4.0
Cecil cobbly sandy loam, 2 to 10 percent slopes	60	550	65	5.4	4.5
Cecil sandy loam, 2 to 6 percent slopes, eroded	95	750	90	6.5	5.0
Cecil sandy loam, 6 to 10 percent slopes, eroded	90	700	85	6.3	4.5
Cecil sandy loam, 10 to 25 percent slopes, eroded				5.5	3.0
Cecil sandy clay loam, 2 to 6 percent slopes, eroded	70	500	70	5.0	3.5
Cecil sandy clay loam, 6 to 10 percent slopes, eroded	60		60	4.5	3.5
Cecil sandy clay loam, 10 to 25 percent slopes, eroded				4.0	3.0
Chewacla and Starr soils	85		70	7.0	4.0
Congaree and Toccoa soils	100		80	7.0	4.5
Davidson loam, 2 to 6 percent slopes, eroded	90	750	90	5.8	5.0
Davidson loam, 6 to 10 percent slopes, eroded	85	700	85	5.5	4.5
Davidson clay loam, 6 to 10 percent slopes, eroded	60	600	60	4.8	4.0
Davidson clay loam, 10 to 25 percent slopes, eroded				4.5	3.5
Enon soils, 2 to 6 percent slopes, eroded	75	500	70	5.8	4.0
Enon soils, 6 to 10 percent slopes, eroded	65	450	65	5.3	3.5
Esto soils, 10 to 25 percent slopes					3.5
Gwinnett loam, 15 to 35 percent slopes, eroded					
Helena sandy loam, 2 to 6 percent slopes, eroded	80	550	65	5.3	4.0
Helena complex, 6 to 10 percent slopes, eroded	60	475	50	4.8	
Iredell loam, 2 to 6 percent slopes	50		55	7.5	
Lakeland sand, 2 to 10 percent slopes	55	275	30		2.5
Lakeland sand, 10 to 15 percent slopes					2.0
Norfolk loamy sand, 0 to 2 percent slopes	100	675	75	7.5	5.5
Norfolk loamy sand, 2 to 6 percent slopes	90	635	70	7.0	5.4
Norfolk loamy sand, 6 to 10 percent slopes	85	600	65	6.5	5.0
Orangeburg loamy sand, 2 to 6 percent slopes	90	650	70	6.5	6.0
Orangeburg loamy sand, 6 to 10 percent slopes	70	600	70	5.5	6.0
Orangeburg loamy sand, 10 to 20 percent slopes					5.0
Pacolet sandy loam, 10 to 25 percent slopes				4.5	3.5
Red Bay loamy sand, 2 to 6 percent slopes	75	700	70	6.1	6.0
Red Bay sandy loam, 6 to 10 percent slopes, eroded	70	650	65	5.5	5.5
Starr and Toccoa soils	100	550	85	7.0	
Susquehanna fine sandy loam, 5 to 15 percent slopes				6.0	4.0
Vance sandy loam, 2 to 6 percent slopes, eroded	70	500	70	5.3	4.0
Vance sandy loam, 6 to 10 percent slopes, eroded	65	400	60	5.0	3.5
Vance sandy loam, 10 to 25 percent slopes, eroded				4.1	2.5
Vance sandy clay loam, 2 to 10 percent slopes, eroded	40		40	4.0	
Vaucluse loamy sand, 2 to 10 percent slopes	40	350	35		4.0
Wehadkee soils	55			6.2	
Wilkes sandy loam, 2 to 10 percent slopes, eroded				4.5	
Wilkes soils, 10 to 25 percent slopes				3.5	

[1] Animal-unit-months is a term used to express the carrying capacity of pasture. It is the number of months during the year that 1 acre will provide grazing for 1 animal unit (1 cow, 1 horse, 1 mule, 7 sheep, or 5 hogs) without damage to the pasture.

TABLE 4.—*Suitability of the soils for elements*

[Davidson-Urban land complex, 2 to 10 percent slopes (DyC) and Enon-Urban land

Soil series and map symbols	Elements of wildlife habitat			
	Grain and seed crops	Grasses and legumes	Wild herbaceous upland plants	Hardwood trees, shrubs, and vines
Ailey:				
AgB	Fair	Fair	Fair	Poor
AgC	Poor	Fair	Fair	Poor
AhD	Poor	Poor	Fair	Poor
Ailey and Norfolk: AAC	Poor	Fair	Fair	Poor
Buncombe: Bfs	Fair	Fair	Fair	Fair
Cecil:				
CAC	Poor	Fair	Fair	Fair
CyB2	Good	Good	Good	Good
CyC2	Fair	Good	Good	Good
CyE2	Poor	Fair	Good	Good
CZB2	Good	Good	Fair	Fair
CZC2	Fair	Fair	Fair	Fair
CZE2	Poor	Fair	Fair	Fair
Chewacla and Starr: Cst	Fair	Good	Good	Good
Congaree and Toccoa: Cot	Good	Good	Good	Good
Davidson:				
DgB2	Good	Good	Good	Good
DgC2	Fair	Good	Good	Good
DhC2	Fair	Good	Fair	Fair
DhE2	Poor	Fair	Fair	Fair
Enon:				
EjB2	Good	Good	Fair	Good
EjC2	Fair	Good	Fair	Good
Esto: EgE	Poor	Fair	Fair	Fair
Gwinnett: GgF2	Very poor	Fair	Good	Good
Helena:				
HYB2	Good	Good	Good	Good
HOC2	Fair	Good	Fair	Good
Iredell: IcB	Fair	Good	Good	Good
Lakeland: LpC, LpD	Poor	Fair	Fair	Poor
Norfolk:				
NhA, NhB	Good	Good	Good	Good
NhC	Fair	Good	Good	Good
Orangeburg:				
OeB	Good	Good	Good	Good
OeC	Fair	Good	Good	Good
OeE	Poor	Fair	Good	Good
Pacolet: PfE	Poor	Fair	Good	Good
Red Bay:				
RgB	Good	Good	Good	Good
RhC2	Fair	Good	Good	Good
Starr and Toccoa: Sen	Good	Good	Good	Good
Susquehanna: SiD	Poor	Good	Good	Good
Vance:				
VaB2	Good	Good	Good	Good
VaC2	Fair	Good	Good	Good
VaE2	Poor	Fair	Good	Good
VbC2	Fair	Good	Fair	Fair

of wildlife habitat and kinds of wildlife

complex, 5 to 12 percent slopes (EwD) were not rated, because of their long-term urban use]

Elements of wildlife habitat—Continued			Kinds of wildlife		
Coniferous woody plants	Wetland food and cover plants	Shallow water developments	Openland	Woodland	Wetland
Poor	Very poor	Very poor	Fair	Poor	Very poor.
Poor	Very poor	Very poor	Fair	Poor	Very poor.
Poor	Very poor	Very poor	Poor	Poor	Very poor.
Poor	Very poor	Very poor	Fair	Poor	Very poor.
Fair	Very poor	Very poor	Fair	Fair	Very poor.
Fair	Very poor	Very poor	Fair	Fair	Very poor.
Good	Very poor	Very poor	Good	Good	Very poor.
Good	Very poor	Very poor	Good	Good	Very poor.
Good	Very poor	Very poor	Fair	Good	Very poor.
Good	Very poor	Very poor	Good	Good	Very poor.
Good	Very poor	Very poor	Fair	Fair	Very poor.
Good	Very poor	Very poor	Fair	Fair	Very poor.
Fair	Fair	Fair	Good	Good	Fair.
Fair	Fair	Poor	Good	Good	Fair.
Good	Very poor	Very poor	Good	Good	Very poor.
Good	Very poor	Very poor	Good	Good	Very poor.
Good	Very poor	Very poor	Fair	Good	Very poor.
Good	Very poor	Very poor	Fair	Fair	Very poor.
Good	Very poor	Very poor	Good	Good	Very poor.
Good	Very poor	Very poor	Fair	Good	Very poor.
Good	Very poor	Very poor	Fair	Fair	Very poor.
Good	Very poor	Very poor	Poor	Good	Very poor.
Good	Very poor	Very poor	Good	Good	Very poor.
Good	Very poor	Very poor	Fair	Good	Very poor.
Fair	Poor	Very poor	Good	Good	Very poor.
Poor	Very poor	Very poor	Fair	Poor	Very poor.
Good	Very poor	Very poor	Good	Good	Very poor.
Good	Very poor	Very poor	Good	Good	Very poor.
Good	Very poor	Very poor	Good	Good	Very poor.
Good	Very poor	Very poor	Good	Good	Very poor.
Good	Very poor	Very poor	Fair	Good	Very poor.
Good	Very poor	Very poor	Fair	Good	Very poor.
Good	Very poor	Very poor	Good	Good	Very poor.
Good	Very poor	Very poor	Good	Good	Very poor.
Good	Poor	Poor	Good	Good	Poor.
Good	Very poor	Very poor	Fair	Good	Very poor.
Good	Very poor	Very poor	Good	Good	Very poor.
Good	Very poor	Very poor	Good	Good	Very poor.
Good	Very poor	Very poor	Fair	Good	Very poor.
Good	Very poor	Very poor	Fair	Fair	Very poor.

TABLE 4.—*Suitability of the soils for elements of*

Soil series and map symbols	Elements of wildlife habitat			
	Grain and seed crops	Grasses and legumes	Wild herbaceous upland plants	Hardwood trees, shrubs, and vines
Vaucluse: VeC	Fair	Good	Good	Fair
Wehadkee: Whs	Poor	Fair	Fair	Fair
Wilkes:				
WiC2	Fair	Good	Fair	Fair
WiE	Poor	Fair	Fair	Fair

6. Fertilizer is applied according to soil tests and crop needs.
7. Adapted crop varieties are used at suitable seeding rates.

The following paragraphs give the rates of fertilization and seeding and other practices that are required for each crop if the yields in table 3 are to be obtained:

CORN: The soils used for corn receive per acre 100 to 150 pounds of nitrogen (N), 40 to 60 pounds of phosphoric acid (P_2O_5), and 60 to 100 pounds of potash (K_2O). The crop is seeded at a rate that provides 12,000 to 15,000 plants per acre. Lime is applied according to needs indicated by soil tests.

COTTON: At planting time the soils used for cotton receive per acre 70 to 110 pounds of nitrogen, 50 to 70 pounds of phosphoric acid, and 75 to 125 pounds of potash. Planting is at a rate that provides 40,000 to 60,000 plants per acre.

OATS: At planting time the soils used for oats receive per acre 30 to 35 pounds of nitrogen, 40 pounds of phosphoric acid, and 60 to 80 pounds of potash. An additional 30 or 35 pounds of nitrogen is applied in February.

FESCUE AND LEGUMES: These are pasture plants, a combination that produces good forage. Soils used for pasture receive no nitrogen if legumes make up more than half the stand, but 30 to 60 pounds in proportion to the amount of legumes grown in fields where legumes make up less than half the stand; 40 to 50 pounds of phosphoric acid; and 75 to 90 pounds of potash. Apply half the nitrogen in the fall and half in February.

COASTAL BERMUDAGRASS: Soils used for Coastal bermudagrass receive per acre 60 pounds of nitrogen, 25 to 60 pounds of phosphoric acid, and 50 to 120 pounds of potash. After each cutting of hay, an additional 60 pounds of nitrogen is applied. The planting rate is 10,000 to 14,000 sprigs per acre.

Use of the Soils for Wildlife Habitat[4]

Soils directly influence the kind and amount of vegetation and the amount of water available, and in this way they indirectly influence the kind of wildlife that can live in an area. Soil properties that affect the productivity of wildlife habitat are thickness of soil useful to plants, texture of the surface layer, available water capacity to a depth of 40 inches, wetness, surface stoniness or rockiness, flood hazard, slope, and permeability of the soil to air and water.

Table 4, beginning on page 42, shows the suitability of the soils of the survey area for seven elements of wildlife habitat and for three kinds of wildlife. A rating of *good* means that habitats generally are easily created, improved, and maintained. Few or no limitations affect management, and satisfactory results can be expected.

Fair means that habitats can be created, improved, or maintained in most places. However, moderate intensity of management and fairly frequent attention may be required for satisfactory results.

Poor means that limitations for the designated use are rather severe. Habitats can be created, improved, or maintained in most places, but management is difficult and requires intensive effort.

Very poor means that limitations are very severe and that unsatisfactory results are to be expected. It is either impossible or impractical to create, improve, or maintain habitats.

Each soil is rated in table 4 according to its suitability for producing various kinds of plants and other elements that make up wildlife habitats. These ratings take into account mainly the characteristics of the soils and closely related natural factors of the environment. They do not take into account climate, present use of soils, or present distribution of wildlife and people. For this reason, selection of a site for development as a habitat for wildlife requires inspection at the site.

The elements of wildlife habitat shown in table 4 are briefly discussed in the following paragraphs.

Grain and seed crops are annual grain-producing plants, such as corn, sorghum, millet, soybeans, proso, benne, and peas.

Grasses and legumes are domestic grasses and legumes that are established by planting. They provide food and cover for wildlife. Among the grasses are bahiagrass, ryegrass, and panicgrass. Among the legumes are annual lespedeza, shrub lespedeza, and clovers and vetches.

[4] JESSE MERCER, JR., biologist, Soil Conservation Service, helped prepare this section.

wildlife habitat and kinds of wildlife—Continued

Elements of wildlife habitat—Continued			Kinds of wildlife		
Coniferous woody plants	Wetland food and cover plants	Shallow water developments	Openland	Woodland	Wetland
Fair	Very poor	Very poor	Good	Fair	Very poor.
Fair	Good	Fair	Fair	Fair	Fair.
Fair	Very poor	Very poor	Fair	Fair	Very poor.
Fair	Very poor	Very poor	Fair	Fair	Very poor.

Wild herbaceous upland plants are native or introduced perennial grasses, forbs, and weeds that provide food and cover for upland wildlife. Beggarweed, perennial lespedeza, wild bean, pokeweed, partridge peas, and cheatgrass are typical examples. On range, typical plants are bluestem, grama, perennial forbs, and legumes.

Hardwood trees, shrubs, and vines are nonconiferous trees, shrubs, and woody vines that produce wildlife food in the form of fruits, nuts, buds, catkins, or browse. Such plants commonly grow in their natural environment, but they may be planted and developed through wildlife management programs. Typical plants in this category are oak, beech, cherry, dogwood, maple, viburnum, grape, honeysuckle, greenbrier, silverberry, and hawthorn.

Coniferous woody plants are cone-bearing trees and shrubs that provide cover and frequently furnish food in the form of browse, seeds, or fruitlike cones. They commonly grow in their natural environment, but they may be planted and managed. Typical plants in this category are pines, cedars, and ornamental trees and shrubs.

Wetland food and cover plants are annual and perennial herbaceous plants that grow on moist and wet sites. They furnish food and cover mostly for wetland wildlife. Typical examples of these plants are smartweed, wild millet, spikerush and true rushes, sedges, burreed, tearthumb, and aneilema. Submerged and floating aquatics are not in this category. The habitat is developed by dikes and water control structures. Water is manipulated to allow planting, production, and harvest of desirable plants.

Shallow water developments are impoundments or excavations for controlling water, generally not more than 5 feet deep, to create habitats that are suitable for waterfowl. Some are designed to be drained, planted, and then flooded; others are permanent impoundments that grow submersed aquatics.

Table 4 rates the soils according to their suitability as habitat for the three kinds of wildlife in the counties—openland, woodland, and wetland wildlife. These ratings are related to the ratings for elements of habitat. For example, soils rated very poor for shallow water developments are rated very poor for wetland wildlife.

Openland wildlife are birds and mammals that normally live in meadows, pastures, and open areas where grasses, herbs, and shrubby plants grow. Quail, doves, meadowlarks, field sparrows, cottontail rabbits, and foxes are typical examples of openland wildlife.

Woodland wildlife are birds and mammals that normally live in wooded areas of hardwood trees, coniferous trees, and shrubs. Woodcocks, thrushes, wild turkeys, vireos, deer, squirrels, opossum, and raccoons are typical examples of woodland wildlife.

Wetland wildlife are birds and mammals that normally live in wet areas, marshes, and swamps. Ducks, geese, rails, shore birds, herons, minks, beaver, and muskrats are typical examples of wetland wildlife.

Engineering Uses of the Soils[5]

This section is useful to those who need information about soils used as structural material or as foundation upon which structures are built. Among those who can benefit from this section are planning commissions, town and city managers, land developers, engineers, contractors, and farmers.

Among properties of soils highly important in engineering are permeability, strength, compaction characteristics, soil drainage condition, shrink-swell potential, grain size, plasticity, and soil reaction. Also important are depth to the water table, depth to bedrock, and soil slope. These properties, in various degrees and combinations, affect construction and maintenance of roads, airports, pipelines, foundations for small buildings, irrigation systems, ponds and small dams, and systems for disposal of sewage and refuse.

Information in this section of the soil survey can be helpful to those who—

1. Select potential residential industrial, commercial, and recreational areas.
2. Evaluate alternate routes for roads, highways, pipelines, and underground cables.
3. Seek sources of gravel, sand, or clay.
4. Plan farm drainage systems, irrigation sys-

[5] FELTON B. FLOURNOY, civil engineer, Soil Conservation Service, helped prepare this section.

TABLE 5.—*Engineering*

[Tests performed by the Georgia State Highway Department in accordance with

Soil name and location	Parent material	Report No.	Depth	Moisture density[1]		Volume change		
				Maximum dry density	Optimum moisture	Shrinkage	Swell	Total volume change
			Inches	*Pounds per cubic foot*	*Percent*	*Percent*	*Percent*	*Percent*
Ailey loamy sand. Baldwin County: 11 miles west of Milledgeville Post Office on State Highway No. 49, 2 miles south on county road to Union Church. (Modal.)	Marine deposits.	*S67-Ga-5*						
		3–2	8–32	119	9	0.2	0.0	0.2
		3–4	40–60	112	14	0.9	2.6	3.5
		3–5	60–70	110	16	0.1	0.1	0.2
Enon sandy loam. Baldwin County: 9 miles northwest of Milledgeville, 1.5 miles west of State Highway No. 212 on Nelson Rd. (Modal.)	Residuum from acid and basic rocks, principally granite, gneiss, feldspar, diorite, gabbro, and hornblende of the Piedmont Plateau.	1–1	0–4	105	15	3.5	21.2	24.7
		1–2	4–16	88	28	14.0	13.0	27.0
		1–3	16–29	85	31	12.6	13.4	26.0
Helena sandy clay loam. Jones County: 4 miles south of Gray on east side of unpaved county road. (Contains more fines than modal.)	A mixture of acid and basic crystalline rocks, such as aplitic granite or granite gneiss cut by dikes of gabbro and diorite or mixed hornblende schist or hornblende gneiss.	*S67-Ga-84*						
		5–1	0–3	101	19	2.7	15.2	17.9
		5–2	3–10	94	26	16.5	32.0	48.5
		5–3	10–23	104	21	17.0	16.9	33.9
Iredell loam. Putnam County: 7.7 miles north of Eatonton on U.S. Highway No. 441, 3.8 miles east on county road. (Heavier textured than modal.)	Residuum from mixed acidic and basic crystalline rocks, principally granite and gneiss cut by intrusions of such basic rocks as diorite, gabbro, hornblende gneiss, and hornblende schists.	*S67-Ga-117*						
		1–1	0–9	118	12	0.9	7.9	8.8
		1–4	22–32	82	33	18.4	14.9	33.3
		1–5	3–258	97	21	3.7	16.4	20.1
Norfolk loamy sand. Baldwin County: 7 miles southeast of Milledgeville off lower Sandersville Road. (Modal.)	Old alluvial sediments washed from acid soils of the Coastal Plain.	*S66-Ga-5*						
		2–1	0–6	122	9	0.0	3.9	3.9
		2–3	11–242	120	11	3.4	1.2	4.6
		2–4	24–43	115	12	3.9	0.3	4.2
Wilkes sandy loam. Jones County: 1 mile north of Gray on east side of U.S. Highway No. 129. (Modal.)	Residual acid and basic rocks, granites and gneisses, diorite, and gabbros.	*S67-Ga-84*						
		1–1	0–2	105	18	2.7	15.8	18.5
		1–3	7–18	101	20	9.2	20.1	29.3
		1–4	18–48	110	15	2.5	21.2	23.7
Jones County: 12 miles northwest of Gray, one-fourth mile north of State Highway No. 18 on dirt road to Hitchiti Experimental Forest. (Contains less clay throughout than modal.)	Residual acid and basic rocks, granite and gneisses, diorite, and gabbros.	4–1	0–7	113	14	1.6	11.3	12.9
		4–4	18–26	100	21	10.0	25.8	35.8
		4–5	26–48	99	21	11.0	34.1	45.1

[1] Based on AASHO Designation T 99, Method A (*1*).

[2] Mechanical analyses according to the AASHO Designation T 88 (*1*). Results by this procedure frequently may differ somewhat from results that would have been obtained by the soil survey procedure of the Soil Conservation Service (SCS). In the AASHO procedure, the fine material is analyzed by the hydrometer method and the various grain-size fractions are calculated on the basis of all the material, including that coarser than 2 millimeters in diameter. In the SCS soil survey procedure, the fine material is analyzed by the pipette method and the material coarser than 2

test data

standard procedures of the American Association of State Highway Officials (AASHO)]

Mechanical analysis[2]											Liquid limit	Plasticity index	Classification	
Percentage passing sieve—							Percentage smaller than—						AASHO[3]	Unified[4]
1-in	¾-in	⅜-in	No. 4 (4.7 mm)	No. 10 (2.0 mm)	No. 40 (0.42 mm)	No. 200 (0.074 mm)	0.05 mm	0.02 mm	0.005 mm	0.002 mm				
------	------	100	99	94	68	18	16	13	9	6	--------	[5] NP	A-2-4(0)	SM
------	------	------	100	99	69	30	29	28	27	26	28	9	A-2-4(0)	SC
------	------	------	--------	100	55	23	22	22	21	20	29	8	A-2-4(0)	SC
------	100	99	99	96	72	29	28	24	16	11	--------	NP	A-2-4(0)	SM
------	------	------	--------	100	95	74	74	73	63	56	56	26	A-7-5(17)	CH
------	------	------	--------	100	98	78	76	74	68	63	59	25	A-7-5(18)	MH
[6] 99	98	94	90	83	76	52	49	37	17	12	--------	NP	A-4(3)	ML
------	------	100	97	92	87	72	72	71	61	51	60	34	A-7-6(19)	CH
------	------	------	100	99	92	67	66	57	46	38	45	25	A-7-6(13)	CL
------	------	100	97	84	72	37	31	21	10	7	--------	NP	A-4(0)	SM
------	------	------	--------	100	97	94	93	92	91	87	83	47	A-7-5(20)	CH
------	------	------	--------	100	61	39	34	26	14	10	--------	NP	A-4(1)	SM
------	------	------	--------	98	72	24	22	17	8	5	--------	NP	A-2-4(0)	SM
------	------	100	99	96	79	44	42	40	31	27	28	14	A-6(3)	SC
------	------	------	100	97	80	45	43	49	33	31	32	12	A-6(3)	SC
[6] 98	98	97	95	92	84	26	23	19	14	12	--------	NP	A-2-4(0)	SM
------	------	------	--------	100	94	46	45	39	34	31	40	14	A-6(3)	SC
------	100	99	99	98	90	23	21	15	13	11	--------	NP	A-2-4(0)	SM
------	100	98	94	92	80	32	30	24	16	13	--------	NP	A-2-4(0)	SM
------	------	------	100	99	91	53	50	42	30	26	51	23	A-7-6(9)	CH
------	------	------	100	99	93	46	44	38	28	21	54	16	A-7-5(5)	SM

millimeters in diameter is excluded from calculations of grain-size fractions. The mechanical analyses used in this table are not suitable for use in naming textural classes for soil.

[3] Based on AASHO Designation M 145-49 (*1*).

[4] Based on the Unified Soil Classification System (*7*). Densities and volume changes were not corrected for total sample.

[5] NP means nonplastic.

[6] 100 percent passed 1½-inch sieve.

TABLE 6.—*Estimated soil properties*

[An asterisk in the first column indicates that at least one mapping unit in this series is made up of two or more kinds of soil. The soils in such to other series that appear in the first column of this table. Absence of data indicates that the soil is too variable

Soil series and mapping symbols	Depth to hard rock	Depth to seasonal high water table	Depth from surface	Classification		
				USDA texture	Unified	AASHO
	Feet	*Inches*	*Inches*			
*Ailey: AgB, AgC, AhD, AAC. For properties of the Norfolk part of AAC, see the Norfolk series.	15	60	0–29	Loamy sand	SM, SP-SM	A-2
			29–42	Sandy clay loam	SC, SM	A-2, A-4
			42–65	Sandy clay loam (fragipan).	SM, SC	A-2, A-4
Buncombe: Bfs	10	60	0–42	Loamy sand	SM	A-2
			42–60	Sandy loam	SM	A-2
Cecil: CAC[1], CyB2, CyC2, CyE2, CZB2, CZC2, CZE2.	15	60	0–8	Sandy loam	SM	A-2
			8–16	Sandy clay loam and clay loam.	ML, CL, SM	A-6
			16–44	Clay	MH	A-7
			44–60	Clay loam	CL, ML	A-6
			60–84	Saprolite rock		
*Chewacla: Cst. For properties of the Starr part, see the Starr series.	10	21–24	0–7	Silt loam	ML	A-4
			7–52	Clay loam and silty clay loam.	ML, CL	A-4, A-6
*Congaree: Cot. For properties of the Toccoa part, see the Toccoa series.	10	36–40	0–6	Fine sandy loam	SM	A-4, A-2
			6–18	Loam	ML	A-4
			18–23	Loamy coarse sand.	SM	A-2
			23–44	Loam and fine sandy loam.	SM	A-4
			44–65	Loamy sand	SM	A-2
Davidson: DgB2, DgC2, DhC2, DhE2, DyC. Properties of Urban land part of DyC are too variable to be estimated.	20	60	0–7	Loam	ML	A-4
			7–12	Clay loam	CL	A-6, A-4
			12–72	Clay	MH, CL	A-7, A-6
Enon: EwD, EjB2, EjC2. Properties of the Urban land part of EwD are too variable to be estimated.	>10	>60	0–4	Sandy loam	SM	A-2, A-4
			4–31	Clay	CH, MH	A-7
			31–60	Saprolite rock	SC, CL	A-4
Esto: EgE	>6	>60	0–10	Loamy sand	SM	A-2
			10–16	Sandy clay loam	SC, CL	A-6, A-7
			16–72	Sandy clay	SC, CL	A-6, A-7
Gwinnett: GgF2	>6	>60	0–3	Loam	SM	A-2, A-4
			3–38	Clay and clay loam.	MH, CL	A-7
			38–74	Saprolite rock	SM	A-4
			74	Intermittent hard rock.		
Helena: HYB2, HOC2	4–15	30	0–3	Sandy loam and sandy clay loam.	SM, SC, ML	A-2, A-4
			3–48	Clay and sandy clay.	CH, MH, CL	A-7
			48–60	Weathered rock.		
Iredell: IcB	>6	12–24	0–7	Loam and sandy loam.	SM	A-2, A-4
			7–25	Clay	CH	A-7
			25–60	Saprolite	SM	A-4, A-2
Lakeland: LpC, LpD	>20	>120	0–14	Sand	SP, SM	A-2, A-3
			14–86	Sand	SP, SM	A-3, A-2
Norfolk: NhA, NhB, NhC	>20	>60	0–10	Loamy sand	SM	A-2
			10–17	Sandy loam	SM, SC	A-2, A-6
			17–80	Sandy clay loam	SC	A-6, A-4

significant in engineering

mapping units may have different properties and limitations, and for this reason it is necessary to follow carefully the instructions for referring to be rated or that no estimate was made. The symbol > means more than; the symbol < means less than]

Percentage passing sieve—				Permeability	Available water capacity	Reaction	Shrink-swell potential
No. 4 (4.7 mm)	No. 10 (2.0 mm)	No. 40 (0.42 mm)	No. 200 (0.074 mm)				
				Inches per hour	*Inches per inch of soil*	*pH*	
95–100	75–95	60–80	10–20	6.0–20.0	0.03–0.05	5.1–5.5	Low.
95–100	75–100	60–90	30–40	0.6–2.0	0.09–0.11	5.1–5.5	Low.
95–100	90–100	55–75	20–40	0.02–0.6	0.06–0.10	5.1–5.5	Low.
100	98–100	60–80	15–20	6.0–10.0	0.06–0.08	4.5–5.0	Low.
100	100	70–80	20–35	6.0–10.0	0.10–0.12	4.5–5.0	Low.
85–100	80–100	65–90	25–35	2.0–6.0	0.12–0.14	5.1–5.5	Low.
95–100	90–100	70–90	40–60	0.6–2.0	0.11–0.13	5.1–5.5	Low.
95–100	90–100	70–90	55–70	0.6–2.0	0.13–0.15	5.1–5.5	Low.
95–100	85–100	60–90	50–60	0.6–2.0	0.13–0.15	5.1–5.5	Low.
100	95–100	80–90	50–85	0.6–2.0	0.13–0.15	5.1–6.0	Low.
100	95–100	70–90	60–90	0.6–2.0	0.17–0.19	5.1–6.0	Low.
100	95–100	60–90	30–40	2.0–6.0	0.12–0.14	5.1–6.0	Low.
100	98–100	60–100	50–65	0.6–2.0	0.12–0.15	5.6–6.0	Low.
100	95–100	60–100	15–20	2.0–6.0	0.04–0.06	5.6–6.0	Low.
100	95–100	60–100	36–45	0.6–2.0	0.10–0.15	5.6–6.0	Low.
100	95–100	60–100	15–20	2.0–6.0	0.05–0.08	5.1–5.5	Low.
95–100	95–100	80–95	50–65	2.0–6.0	0.12–0.14	5.1–5.5	Low.
95–100	95–100	85–95	50–75	0.6–2.0	0.12–0.14	5.1–5.5	Low.
95–100	95–100	78–100	65–85	0.6–2.0	0.10–0.14	5.1–6.0	Moderate.
99–100	96–100	72–85	29–50	2.0–6.0	0.10–0.13	6.1–6.5	Low.
100	100	90–100	74–90	0.06–0.2	0.13–0.15	6.1–7.3	High.
100	100	90–100	40–80	2.0–6.0	0.10–0.13	6.6–7.3	Low.
95–100	95–100	55–80	20–35	2.0–20.0	0.08–0.12	4.5–5.0	Low.
95–100	95–100	80–90	40–55	0.6–2.0	0.10–0.15	4.5–5.0	Moderate.
95–100	95–100	75–90	45–65	0.06–0.2	0.10–0.15	4.5–5.0	Moderate.
95–100	85–100	70–90	30–40	0.6–2.0	0.11–0.13	5.1–6.0	Low.
95–100	95–100	80–95	55–75	0.6–2.0	0.11–0.16	5.1–6.0	Moderate.
95–100	75–90	75–90	40–50	0.6–2.0	0.10–0.13	5.1–6.0	Low.
90–100	83–100	65–80	30–52	2.0–6.0	0.10–0.12	5.1–5.5	Low.
97–100	95–100	80–93	65–72	0.06–0.2	0.13–0.15	5.1–5.5	High.
80–97	80–90	70–85	30–50	2.0–6.0	0.10–0.13	5.6–6.5	Low.
100	100	85–97	80–94	0.06–0.2	0.17–0.20	5.6–6.5	High.
95–100	95–100	60–90	34–45	0.6–2.0	0.09–0.12	6.6–7.3	Low.
100	98–100	70–80	4–13	6.0–20.0	0.04–0.06	5.1–5.5	Low.
100	98–100	70–80	4–13	6.0–20.0	0.03–0.05	5.1–5.5	Low.
100	98–100	65–85	16–30	6.0–8.0	0.06–0.08	5.1–5.5	Low.
95–100	96–100	70–85	20–45	2.0–6.0	0.10–0.12	5.1–5.5	Low.
95–100	90–100	70–90	36–45	0.6–2.0	0.12–0.14	5.1–5.5	Low.

TABLE 6.—*Estimated soil properties*

Soil series and mapping symbols	Depth to hard rock	Depth to seasonal high water table	Depth from surface	Classification		
				USDA texture	Unified	AASHO
	Feet	*Inches*	*Inches*			
Orangeburg: OeB, OeC, OeE	>20	>60	0–17	Loamy sand and sandy loam.	SM	A-2
			17–80	Sandy clay loam	SC, CL	A-6, A-4
Pacolet: PfE	>6	>60	0–6	Sandy loam	SM	A-2
			6–22	Clay	MH	A-7, A-6
			22–36	Clay loam	CL	A-6
			36–54	Sandy clay and saprolite.	CL, SM	A-6, A-2
Red Bay: RgB, RhC2	>20	>60	0–8	Loamy sand	SM	A-2
			8–72	Sandy clay loam	SC, SM	A-2
*Starr: Sen. For properties of the Toccoa part, see the Toccoa series.	>20	>60	0–7	Sandy loam	SM	A-2, A-4
			7–30	Clay loam	CL	A-6
			30–48	Clay	CL	A-6
			48–64	Clay loam	SC	A-6
Susquehanna: SiD	>20	20–30	0–5	Fine sandy loam	ML, SM	A-4
			5–80	Clay and sandy clay.	CH	A-7
Toccoa. Mapped only in undifferentiated groups with Starr and Congaree soils.	>10	30–36	0–54	Sandy loam, fine sandy loam, and silt loam.	SM	A-4, A-2
Urban land. No estimates. Properties too variable.			54–64	Very fine sandy loam.	SM, ML	A-4, A-2
Vance: VaB2, VaC2, VaE2, VbC2	>10	>60	0–7	Sandy loam	SM	A-2
			7–37	Clay	MH, MH-CH	A-7
			37–60	Saprolite	SM	A-4
Vaucluse: VeC	>20	>60	0–9	Loamy sand	SM	A-2
			9–17	Sandy loam	SM	A-2
			17–45	Sandy clay loam	SC, SM	A-2, A-6
			45–62	Sandy clay loam	SC, SM	A-2
Wehadkee: Whs	>10	0–15	0–9	Loam	ML	A-4
			9–43	Sandy clay loam	ML, CL	A-4, A-6
			43–54	Sandy loam	SM	A-2, A-4
Wilkes: WiC2, WiE	2½–4	>50	0–6	Sandy loam	SM	A-2
			6–17	Sandy clay loam and clay.	CH, MH, SC	A-7, A-6
			17–45	Weathered rock	SM	A-7, A-2

[1] Contains 20 to 30 percent material coarser than 3 inches in diameter in the surface layer. In this survey area, this soil is the only soil that has coarse material that affects soil properties.

tems, ponds, terraces, and other structures for controlling water and conserving soil.

5. Correlate performance of structures already built with properties of the kinds of soil on which they are built, for the purpose of predicting performance of structures on the same or similar kinds of soil in other locations.
6. Predict the trafficability of soils for cross-country movement of vehicles and construction equipment.
7. Develop preliminary estimates pertinent to construction in a particular area.

Most of the information in this section is presented in tables 5, 6, and 7. Table 5 shows results of engineering laboratory tests on soil samples; table 6 gives several estimated soil properties significant to engineering; and table 7 gives interpretations for various engineering uses.

This information, along with the soil map and other parts of this publication, can be used to make interpretations in addition to those given in these tables, and it also can be used to make other useful maps.

This information, however, does not eliminate the need for further investigations at sites selected for

significant to engineering—Continued

Percentage passing sieve—				Permeability	Available water capacity	Reaction	Shrink-swell potential
No. 4 (4.7 mm)	No. 10 (2.0 mm)	No. 40 (0.42 mm)	No. 200 (0.074 mm)				
				Inches per hour	*Inches per inch of soil*	*pH*	
98–100	95–100	64–90	15–25	2.0–6.0	0.06–0.08	4.5–5.5	Low.
98–100	95–100	65–95	38–55	0.6–2.0	0.10–0.13	4.5–5.5	Low.
95–100	35–100	30–50	20–35	2.0–6.0	0.10–0.12	5.1–6.0	Low.
95–100	90–100	60–70	50–70	0.6–2.0	0.12–0.14	5.1–6.0	Low.
95–100	90–100	60–70	50–70	0.6–2.0	0.11–0.13	5.1–6.0	Low.
80–100	80–100	40–60	30–55	0.6–2.0	0.09–0.11	5.1–6.0	Low.
100	95–100	65–70	15–20	6.0–8.0	0.07–0.09	5.1–5.5	Low.
100	95–100	70–75	25–35	0.6–2.0	0.10–0.12	5.1–5.5	Low.
90–100	90–100	75–90	30–40	2.0–8.0	0.14–0.18	5.1–6.0	Low.
95–100	90–100	70–95	50–60	2.0–6.0	0.10–0.18	5.1–6.0	Moderate.
95–100	95–100	70–95	60–80	2.0–6.0	0.12–0.15	5.1–6.0	Moderate.
95–100	90–100	70–80	40–50	2.0–6.0	0.12–0.14	5.1–6.0	Moderate.
100	100	70–85	45–55	0.6–2.0	0.12–0.15	4.5–5.0	Low.
100	100	80–95	75–90	<0.06	0.15–0.20	4.5–5.0	High.
95–100	95–100	65–98	30–45	2.0–6.0	0.07–0.11	6.1–6.5	Low.
95–100	95–100	65–98	30–60	2.0–6.0	0.09–0.11	6.6–7.3	Low.
90–98	90–97	55–75	20–35	2.0–6.0	0.10–0.12	5.1–5.5	Low.
95–100	95–100	80–95	65–85	0.06–0.2	0.12–0.14	5.1–5.5	Moderate.
95–100	90–98	65–95	36–45	2.0–6.0	0.08–0.10	5.1–5.5	Low.
98–100	90–100	40–70	15–20	2.0–6.0	0.04–0.06	4.5–5.0	Low.
98–100	95–100	50–70	25–75	2.0–6.0	0.06–0.10	4.5–5.0	Low.
95–100	95–100	60–75	30–45	0.06–0.2	0.09–0.11	4.5–5.0	Low.
98–100	95–100	50–70	25–35	0.2–0.6	0.08–0.11	4.5–5.0	Low.
100	100	80–95	60–75	2.0–6.0	0.12–0.18	5.6–6.5	Low.
100	100	80–95	50–60	0.6–2.0	0.12–0.15	5.6–6.5	Low.
100	100	80–95	30–45	0.6–2.0	0.12–0.15	5.6–6.5	Low.
94–100	90–100	70–90	20–35	2.0–6.0	0.10–0.12	5.1–6.5	Low.
80–100	85–100	80–95	46–75	0.2–0.6	0.12–0.14	6.1–6.5	High.
90–100	90–100	90–100	20–50	0.2–0.6	0.03–0.05	6.6–7.3	Low.

engineering works, especially works that involve heavy loads or that require excavations to depths more than those shown in the tables, generally depths more than 6 feet. Also, inspection of sites, especially the small ones, is needed because many delineated areas of a given soil mapping unit may contain small areas of other kinds of soil that have strongly contrasting properties and different suitabilities or limitations for soil engineering.

Some of the terms used in this soil survey have special meaning to soil scientists that is not known to all engineers. The Glossary defines many of these terms commonly used in soil science.

Engineering soil classification systems

The two systems most commonly used in classifying samples of soils for engineering are the Unified system (*7*) used by the SCS engineers, Department of Defense, and others, and the AASHO system (*1*) adopted by the American Association of State Highway Officials.

In the Unified system soils are classified according to particle-size distribution, plasticity, liquid limit, and organic matter. Soils are grouped in 15 classes. There are eight classes of coarse-grained soils, identified as GW, GP, GM, GC, SW, SP, SM, and

TABLE 7.—*Engineering*

[An asterisk in the first column indicates that at least one mapping unit in this series is made up of two or more kinds of soil. The soils in such to other series that appear in

Soil series and map symbols	Degree and kind of limitation for—		Suitability as a source of—		
	Shallow excavations	Local roads and streets	Roadfill	Sand	Topsoil
*Ailey:					
AgB, AgC	Moderate: loamy sand to a depth of 29 to 40 inches over a fragipan.	Slight	Fair to good: fair to good traffic-supporting capacity.	Poor: poor grain-size distribution.	Poor: low fertility; sandy to a depth of about 29 to 40 inches.
AhD	Moderate: slope	Moderate: slope	Fair to good: fair to good traffic-supporting capacity.	Poor: poor grain-size distribution.	Poor: low fertility; sandy to a depth of about 29 to 40 inches.
AAC. For Norfolk part of AAC, see unit NhC in the Norfolk series.	Moderate: sandy material to a depth of 29 to 40 inches over a fragipan.	Slight	Fair to good: fair to good traffic-supporting capacity.	Poor: poor grain-size distribution.	Poor: low fertility; sandy to a depth of about 29 to 40 inches.
Buncombe: Bfs	Severe: flooding	Severe: flooding	Good	Fair: excessive fines.	Poor: sandy texture throughout.
Cecil:					
CAC	Moderate: kaolinitic clay in subsoil.	Moderate: kaolinitic clay in subsoil.	Fair: fair traffic-supporting capacity.	Poor: sand not available.	Fair: clayey subsoil at a depth of about 16 inches.
CyB2, CZB2	Moderate: kaolinitic clay in subsoil.	Moderate: kaolinitic clay in subsoil.	Fair: fair traffic-supporting capacity.	Poor: sand not available.	Fair: clayey subsoil at a depth of about 16 inches.
CyC2, CZC2	Moderate: kaolinitic clay in subsoil.	Moderate: kaolinitic clay in subsoil.	Fair: fair traffic-supporting capacity.	Poor: sand not available.	Fair: clayey subsoil at a depth of about 16 inches.
CyE2, CZE2	Severe: slope	Severe: slope	Fair: fair traffic-supporting capacity; slope.	Poor: sand not available.	Fair to poor: clayey texture of subsoil; slope.
*Chewacla: Cst. For Starr part, see Starr series.	Severe: flooding; wetness.	Severe: flooding; wetness.	Fair: wetness; fair traffic-supporting capacity.	Poor: sand not available.	Fair to good: wetness hinders accessibility in wet seasons.
*Congaree: Cot. For Toccoa part, see Toccoa series.	Severe: flooding	Severe: flooding	Fair: fair traffic-supporting capacity.	Poor: sand not available.	Good
*Davidson:					
DgB2	Moderate: kaolinitic clay in subsoil.	Moderate: kaolinitic clay in subsoil.	Fair: fair traffic-supporting capacity.	Poor: sand not available.	Fair: clayey texture of subsoil.
DgC2, DhC2, DyC. Onsite examination is needed for Urban land part of DyC.	Moderate: kaolinitic clay in subsoil.	Moderate: kaolinitic clay in subsoil.	Fair: fair traffic-supporting capacity.	Poor: sand not available.	Fair: clayey texture of subsoil.
DhE2	Severe: slope	Severe: slope	Fair: fair traffic-supporting capacity.	Poor: sand not available.	Fair to poor: slope.

interpretations

mapping units may have different properties and limitations, and for this reason it is necessary to follow carefully the instructions for referring the first column of this table]

Soil features affecting—				
Pond reservoir areas	Embankments	Drainage for crops and pasture	Irrigation	Terraces and diversions
Features generally favorable.	Good to fair compaction characteristics.	Well drained	Low available water capacity.	Features generally favorable.
Features generally favorable.	Good to fair compaction characteristics.	Well drained	Slope	Slope.
Features generally favorable.	Good to fair compaction characteristics.	Well drained	Low available water capacity.	Features generally favorable.
Probable seepage	Medium permeability when compacted.	Excessively drained	Low available water capacity.	Nearly level.
Moderate permeability	Fair to poor compaction characteristics.	Well drained	Coarse fragments	Features generally favorable.
Moderate permeability	Fair to poor compaction characteristics.	Well drained	Features generally favorable.	Features generally favorable.
Moderate permeability	Fair to poor compaction characteristics.	Well drained	Slope	Features generally favorable.
Moderate permeability	Fair to poor compaction characteristics.	Well drained	Slope	Slope.
Moderate permeability	Fair to poor resistance to piping.	Flooding: seasonal high water table.	Seasonal high water table.	Nearly level.
Moderate permeability	Fair to poor resistance to piping.	Flooding	Features generally favorable.	Nearly level.
Moderate permeability	High compressibility; fair to poor compaction characteristics.	Well drained	Features generally favorable.	Features generally favorable.
Moderate permeability	High compressibility; fair to poor compaction characteristics.	Well drained	Slope	Features generally favorable.
Moderate permeability	High compressibility; fair to poor compaction characteristics.	Well drained	Slope	Slope.

TABLE 7.—*Engineering*

Soil series and map symbols	Degree and kind of limitation for—		Suitability as a source of—		
	Shallow excavations	Local roads and streets	Roadfill	Sand	Topsoil
Enon:					
EjB2	Severe: clayey subsoil.	Severe: high shrink-swell potential.	Poor: poor traffic-supporting capacity.	Poor: sand not available.	Poor: thin loamy surface layer over clayey material.
EjC2, EwD. Onsite examination is needed for Urban Land part of EwD.	Severe: clayey subsoil.	Severe: high shrink-swell potential.	Poor: poor traffic-supporting capacity.	Poor: sand not available.	Poor: thin loamy surface layer over clayey material.
Esto: EgE	Severe: slope	Moderate to severe: slope.	Fair: slope	Poor: sand not available.	Poor: slope
Gwinnett: GgF2	Severe: slope	Severe: slope	Fair: fair traffic-supporting capacity; slope.	Poor: sand not available.	Poor: slope
Helena: HOC2, HYB2	Moderate: seasonal high water table.	Severe: high shrink-swell potential; clayey subsoil.	Poor: poor traffic-supporting capacity.	Poor: sand not available.	Poor: thin loamy surface layer over clayey material.
Iredell: IcB	Severe: plastic clay in subsoil.	Severe: high shrink-swell potential.	Poor: poor traffic-supporting capacity.	Poor: sand not available.	Poor: loamy surface layer over a clayey subsoil.
Lakeland:					
LpC	Severe: sand to a depth of more than 80 inches.	Slight	Good	Fair to good: may need washing.	Poor: sandy throughout.
LpD	Severe: sand to a depth of more than 80 inches.	Moderate: slope	Good	Fair to good: may need washing.	Poor: sandy throughout.
Norfolk:					
NhA	Slight	Slight	Good	Poor: sand not available.	Fair to good when surface layer and subsoil are mixed.
NhB	Slight	Slight	Good	Poor: sand not available.	Fair to good when surface layer and subsoil are mixed.
NhC	Slight to moderate: slope.	Slight to moderate: slope.	Good	Poor: sand not available.	Fair to good when surface layer and subsoil are mixed.
Orangeburg:					
OeB	Slight	Slight	Good	Poor: sand not available.	Fair to good when surface layer and subsoil are mixed.
OeC	Slight to moderate: slope.	Slight to moderate: slope.	Good	Poor: sand not available.	Fair to good when surface layer and subsoil are mixed.
OeE	Moderate to severe: slope.	Moderate to severe: slope.	Good	Poor: sand not available.	Fair to good when surface layer and subsoil are mixed.
Pacolet: PfE	Moderate to severe: slope.	Severe: slope	Fair: slope	Poor: sand not available.	Fair: clayey subsoil.
Red Bay:					
RgB	Slight	Slight	Good	Poor: sand not available.	Fair to good when surface layer and subsoil are mixed.
RhC2	Slight to moderate: slope.	Slight to moderate: slope.	Good	Poor: sand not available.	Fair to good when surface layer and subsoil are mixed.

interpretations—Continued

Soil features affecting—				
Pond reservoir areas	Embankments	Drainage for crops and pasture	Irrigation	Terraces and diversions
Features generally favorable.	High compressibility	Well drained	Slow permeability	Clayey subsoil.
Features generally favorable.	High compressibility	Well drained	Slow permeability	Clayey subsoil.
Features generally favorable.	Low to medium compressibility.	Well drained or moderately well drained.	Slope	Slope.
Moderate permeability; probable seepage.	Fair to poor compaction characteristics; coarse fragments in substratum.	Well drained	Slope	Slope.
Features generally favorable.	High compressibility	Slow permeability	Slow permeability	Features generally favorable.
Features generally favorable.	High compressibility	Slow permeability	Slow permeability	Clayey subsoil.
Rapid permeability; probable seepage.	High to medium permeability when compacted.	Excessively drained	Very low available water capacity.	Subject to gullying.
Rapid permeability; probable seepage.	High to medium permeability when compacted.	Excessively drained	Low available water capacity; slope.	Subject to gullying.
Moderate permeability	Features generally favorable.	Well drained	Features generally favorable.	Nearly level.
Moderate permeability	Features generally favorable.	Well drained	Features generally favorable.	Features generally favorable.
Moderate permeability	Features generally favorable.	Well drained	Slope	Features generally favorable.
Moderate permeability	Features generally favorable.	Well drained	Features generally favorable.	Features generally favorable.
Moderate permeability	Features generally favorable.	Well drained	Slope	Features generally favorable.
Moderate permeability	Features generally favorable.	Well drained	Slope	Slope.
Moderate permeability	Fair to poor compaction characteristics.	Well drained	Slope	Slope.
Moderate permeability; probable seepage.	Features generally favorable.	Well drained	Features generally favorable.	Features generally favorable.
Moderate permeability; probable seepage.	Features generally favorable.	Well drained	Slope	Features generally favorable.

TABLE 7.—*Engineering*

Soil series and map symbols	Degree and kind of limitation for—		Suitability as a source of—		
	Shallow excavations	Local roads and streets	Roadfill	Sand	Topsoil
*Starr:					
Sen. For the Toccoa part of Sen, see Toccoa series.	Moderate: seasonal wetness of short duration.	Slight	Fair: fair traffic-supporting capacity.	Poor: sand not available.	Good
Starr part of unit Cst.	Severe: flooding	Severe: flooding	Fair: fair traffic-supporting capacity.	Poor: sand not available.	Good
Susquehanna: SiD	Severe: clayey subsoil.	Severe: high shrink-swell potential.	Poor: poor traffic-supporting capacity.	Poor: sand not available.	Poor: thin loamy layer over clayey material.
Toccoa. Mapped only in undifferentiated groups with Congaree and Starr soils.	Severe: flooding or seasonal high water table.	Severe: flooding or seasonal high water table.	Good to fair: good to fair traffic-supporting capacity.	Poor: sand not available.	Good
Urban land. Mapped only in complexes with Davidson and Enon soils; onsite examination is needed for interpretations.					
Vance:					
VaB2	Severe: clayey subsoil.	Moderate: moderate shrink-swell potential.	Poor: poor traffic-supporting capacity.	Poor: sand not available.	Poor: thin loamy layer over clayey material.
VbC2, VaC2	Severe: clayey subsoil.	Moderate: moderate shrink-swell potential.	Poor: poor traffic-supporting capacity.	Poor: sand not available.	Poor: thin loamy layer over clayey material.
VaE2	Severe: clayey subsoil.	Severe: slope	Poor: poor traffic-supporting capacity.	Poor: sand not available.	Poor: thin loamy layer over clayey material.
Vaucluse: VeC	Moderate: cemented fragipan in subsoil.	Slight	Good	Poor: sand not available.	Fair where surface layer and subsoil are mixed.
Wehadkee: Whs	Severe: flooding; wetness.	Severe: flooding; wetness.	Poor: wetness; flooding.	Poor: sand not available.	Poor: wetness
Wilkes:					
WiC2	Severe: shallow to weathered rock.	Moderate: shallow to weathered rock.	Fair to poor: shallow to weathered rock.	Poor: sand not available.	Poor: thin loamy and clayey layer over weathered rock.
WiE	Severe: shallow to weathered rock.	Moderate: shallow to weathered rock; slope.	Poor: slope	Poor: sand not available.	Poor: thin loamy and clayey layer over weathered rock.

interpretations—Continued

Soil features affecting—				
Pond reservoir areas	Embankments	Drainage for crops and pasture	Irrigation	Terraces and diversions
Moderately rapid permeability.	Moderate compressibility	Well drained	Features generally favorable.	Nearly level.
Moderately rapid permeability.	Moderate compressibility	Well drained	Features generally favorable.	Nearly level.
Features generally favorable.	High compressibility	Very slow permeability	Slope; very slow permeability.	Clayey subsoil; slope.
Moderately rapid permeability.	Fair to poor resistance to piping.	Subject to flooding	Features generally favorable.	Nearly level.
Features generally favorable.	High compressibility	Well drained	Slow permeability	Features generally favorable.
Features generally favorable.	High compressibility	Well drained	Slope; slow permeability.	Features generally favorable.
Features generally favorable.	High compressibility	Well drained	Slope	Slope.
Features generally favorable.	Low to medium compressibility.	Well drained	Low productivity; slope	Moderate erosion hazard.
Features generally favorable.	Good to poor compaction characteristics.	Flooding: seasonal high water table.	Wetness	Flooding: nearly level.
Shallow to weathered rock; probable seepage.	Shallow to weathered rock	Well drained	Low productivity	Shallow to weathered rock.
Shallow to weathered rock; probable seepage.	Shallow to weathered rock	Well drained	Slope	Slope.

SC; six classes of fine-grained soils, identified as ML, CL, OL, MH, CH, and OH; and one class of highly organic soils, identified as Pt. Soils on the borderline between two classes are designated by symbols for both classes; for example, SP-SM.

The AASHO system is used to classify soils according to those properties that affect use in highway construction and maintenance. In this system, a soil is placed in one of seven basic groups ranging from A-1 through A-7 on the basis of grain-size distribution, liquid limit, and plasticity index. In group A-1 are gravelly soils of high bearing strength, or the best soils for subgrade (foundation). At the other extreme, in group A-7, are clay soils that have low strength when wet and that are the poorest soils for subgrade. Where laboratory data are available to justify a further breakdown, the A-1, A-2, and A-7 groups are divided as follows: A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, and A-7-6. As additional refinement, the engineering value of a soil material can be indicated by a group index number. Group indexes range from 0 for the best material to 20 or more for the poorest. The AASHO classification for tested soils, with group index numbers in parentheses, is shown in table 5; the estimated classification, without group index numbers, is given in table 6 for all soils mapped in the survey area.

Soil test data

Table 5 contains engineering test data for some of the major soil series in Baldwin, Jones, and Putnam Counties. These tests were made to help evaluate the soils for engineering purposes. The engineering classifications given are based on data obtained by mechanical analyses and by tests to determine liquid limits and plastic limits. The mechanical analyses were made by combined sieve and hydrometer methods.

Moisture-density (or compaction) data are important in earthwork. If a soil material is compacted at successively higher moisture content, assuming that the compactive effort remains constant, the density of the compacted material increases until the **optimum moisture content** is reached. After that, density decreases with increase in moisture content. The highest dry density obtained in the compactive test is termed **maximum dry density**. As a rule, maximum strength of earthwork is obtained if the soil is compacted to the maximum dry density.

The data on volume change indicate the amount of shrinkage and swelling that is obtained from samples prepared at optimum moisture content and then subjected to drying and wetting. The total change that can occur in a specified soil is the sum of the values given for shrinkage and for swelling.

Liquid limit and plasticity index indicate the effect of water on the strength and consistence of soil material. As the moisture content of a clayey soil is increased from a dry state, the material changes from a semisolid to a plastic. If the moisture content is further increased, the material changes from a plastic to a liquid. The plastic limit is the moisture content at which the soil material changes from the semisolid to plastic. The liquid limit is the moisture content at which the material passes from a plastic to a liquid. The plasticity index is the numerical difference between the liquid limit and the plastic limit. It indicates the range of moisture content within which a soil material is plastic.

Soil properties significant to engineering

Several estimated soil properties significant in engineering are given in table 6. These estimates are made for typical soil profiles, by layers sufficiently different to have different significance for soil engineering. The estimates are based on field observation made in the course of mapping, on test data for these and similar soils, and on experience with the same kinds of soil in other counties. Following are explanations of some of the columns in table 6.

Depth to hardrock is distance from the surface of the soil to the upper surface of the rock layer.

Depth to seasonal high water table is distance from the surface of the soil to the highest level that ground water reaches in the soil in most years.

Soil texture is described in table 6 in the standard terms used by the Department of Agriculture. These terms take into account relative percentages of sand, silt, and clay in soil material that is less than 2 millimeters in diameter. Loam, for example, is soil material that contains 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If the soil contains gravel or other particles coarser than sand, an appropriate modifier is added; for example, gravelly loamy sand. Sand, silt, clay, and some of the other terms used in USDA textural classification are defined in the Glossary of this survey.

Permeability is that quality of a soil that enables it to transmit water or air. It is estimated on basis of those soil characteristics observed in the field, particularly structure and texture. The estimates in table 6 do not take into account lateral seepage or such transient soil features as plowpans and surface crusts.

Available water capacity is the ability of soils to hold water for use by most plants. It is commonly defined as the difference between the amount of water in the soil at field capacity and the amount at the wilting point of most crop plants.

Reaction is the degree of acidity or alkalinity of a soil, expressed in pH values. The pH value and terms used to describe soil reaction are explained in the Glossary.

Shrink-swell potential is the relative change in volume to be expected of soil material with changes in moisture content; that is, the extent to which the soil shrinks as it dries out or swells when it gets wet. Extent of shrinking and swelling is influenced by the amount and kind of clay in the soil. Shrinking and swelling of soils cause much damage to building foundations, roads, and other structures. A **high** shrink-swell potential indicates a hazard to maintenance of structures built in, on, or with material having this rating.

Engineering interpretations of soils

The estimated interpretations in table 7 are based on the engineering properties of soils shown in table 6, on test data for soils in this survey area and others nearby or adjoining, and on the experience of engineers and soil scientists with the soils of Baldwin, Jones, and Putnam Counties. In table 7, ratings are used to summarize limitation or suitability of the soils for all listed purposes other than for pond reservoir areas, drainage for crops and pasture, irrigation, embankments, and terraces and diversions. For these particular uses, table 7 lists those soil features not to be overlooked in planning, installation, and maintenance.

Soil limitations are indicated by the ratings slight, moderate, and severe. **Slight** means that soil properties are generally favorable for the rated use, or that limitations are minor and easily overcome. **Moderate** means that some soil properties are unfavorable but can be overcome or modified by special planning and design. **Severe** means that soil properties are so unfavorable and so difficult to correct or overcome that major soil reclamation and special designs are needed.

Soil suitability is rated by the terms **good**, **fair**, and **poor**, which have meanings approximately parallel to the terms slight, moderate, and severe, respectively.

Following are explanations of the columns in table 7.

Shallow excavations are those that require digging or trenching to a depth of less than 6 feet, as for example, excavations for pipelines, sewerlines, phone and power transmission lines, basements, open ditches, and cemeteries. Desirable soil properties are good workability, moderate resistance to sloughing, gentle slopes, absence of rock outcrops or large stones, and freedom from flooding or a high water table.

Local roads and streets have an all-weather surface expected to carry automobile traffic all year. They have a subgrade of underlying soil material; a base consisting of gravel, crushed rock, or soil material stabilized with lime or cement; and a flexible or rigid surface, commonly asphalt or concrete. These roads are graded to shed water and have ordinary provisions for drainage. They are built mainly from soil at hand, and most cuts and fills are less than 6 feet deep.

Soil properties that most affect design and construction of roads and streets are load-supporting capacity and stability of the subgrade, and the workability and quantity of cut and fill material available. The AASHO and Unified classifications of the soil material and also the shrink-swell potential indicate load-supporting capacity. Wetness and flooding affect stability of the material. Slope, depth to hard rock, content of stones and rocks, and wetness affect ease of excavation and amount of cut and fill needed to reach an even grade.

Road fill is soil material used in embankments for roads. The suitability ratings reflect (1) the predicted performance of soil after it has been placed in an embankment that has been properly compacted and provided with adequate drainage and (2) the relative ease of excavating the material at borrow areas.

Sand used in great quantities in many kinds of construction. The ratings in table 7 provide guidance about where to look for probable sources. A soil rated as a good source of sand generally has a layer at least 3 feet thick. The ratings do not take into account thickness of overburden, location of the water table, or other factors that affect mining of the materials, nor do they indicate quality of the deposit. (Gravel is not shown in table 7, because there are no large deposits of gravel in the three counties.)

Topsoil is used for topdressing an area where vegetation is to be established and maintained. Suitability is affected mainly by ease of working and spreading the soil material, as for preparing a seedbed; natural fertility of the material, or its response of plants when fertilizer is applied; and absence of substances toxic to plants. Texture of the soil material and its content of stone fragments are characteristics that affect suitability, but also considered in the ratings is damage that will result at the area from which topsoil is taken.

Pond reservoir areas hold water behind a dam or embankment. Soils suitable for pond reservoir areas have low seepage, which is related to their permeability and depth to fractured or permeable bedrock or other permeable material (fig. 12).

Pond embankments are raised structures of soil material constructed across drainageways in order to impound water. These embankments are generally less than 20 feet high and are constructed of homogeneous soil material and compacted to medium density. Embankments having core and shell type construction are not rated in this table. Embankment foundation, reservoir area, and slope are assumed to be suitable for pond construction. Soil properties are considered that affect the embankment and the availability of borrow material. The best soils have good slope stability, low permeability, slight compressibility under load, and good re-

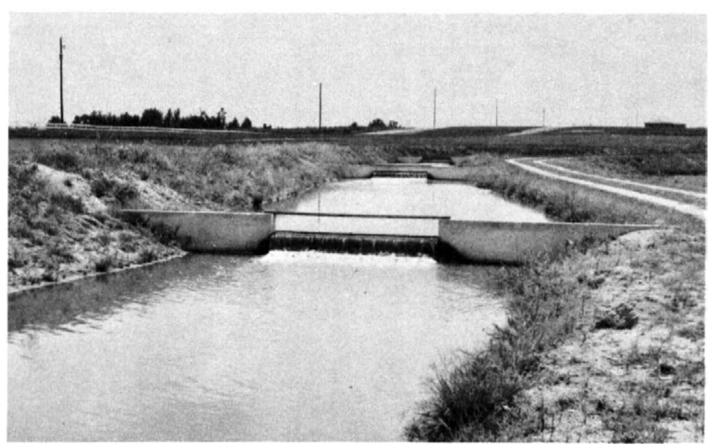

Figure 12.—Catfish raceway. The soil is Cecil sandy loam.

TABLE 8.—*Degree and kind of limitations*

[An asterisk in the first column indicates that at least one mapping unit in this series is made up of two or more kinds of soil. The soils in such to other series that appear in

Soil series and map symbols	Sewage disposal systems: Septic tank absorption fields	Sewage disposal systems: Sewage lagoons	Sanitary landfill[1]	Dwellings without basements
*Ailey:				
AgB	Severe: slow permeability.	Moderate: slope	Slight	Slight
AgC, AAC. For Norfolk part of AAC, see unit NhC in the Norfolk series.	Severe: slow permeability.	Moderate to severe: slope.	Slight	Slight to moderate: slope.
AhD	Severe: slow permeability.	Severe: slope	Slight	Moderate: slope
Buncombe: Bfs	Severe: flooding	Severe: rapid permeability.	Severe: flooding	Severe: flooding
Cecil:				
CAC	Moderate: moderate permeability.	Moderate to severe: slope.	Slight to moderate: slope.	Moderate: kaolinitic clay in subsoil.
CyB2	Moderate: moderate permeability.	Moderate: moderate permeability.	Slight	Moderate: kaolinitic clay in subsoil.
CyC2	Moderate: moderate permeability.	Moderate to severe: slope.	Slight to moderate: slope.	Moderate: kaolinitic clay in subsoil.
CyE2	Severe: slope	Severe: slope	Moderate: slope	Severe: slope
CZB2	Moderate: moderate permeability.	Moderate: moderate permeability.	Slight	Moderate: kaolinitic clay in subsoil.
CZC2	Moderate: moderate permeability.	Moderate to severe: slope.	Slight to moderate: slope.	Moderate: kaolinitic clay in subsoil.
CZE2	Severe: slope	Severe: slope	Moderate: slope	Severe: slope
*Chewacla: Cst. For the Starr part, see the Starr series.	Severe: wetness; flooding.	Severe: wetness; flooding.	Severe: wetness; flooding.	Severe: wetness; flooding.
*Congaree: Cot. For the Toccoa part, see the Toccoa series.	Severe: flooding	Moderate: moderate permeability.	Severe: flooding	Severe: flooding
Davidson:				
DgB2	Moderate: moderate permeability.	Moderate: slope	Moderate: kaolinitic clay in subsoil.	Moderate: moderate shrink-swell potential.
DgC2, DyC. The Urban land part of DyC is too variable to be rated.	Moderate: moderate permeability.	Moderate to severe: slope.	Moderate: kaolinitic clay in subsoil.	Moderate: moderate shrink-swell potential.
DhC2	Moderate: moderate permeability.	Moderate to severe: slope.	Moderate: kaolinitic clay in subsoil.	Moderate: moderate shrink-swell potential.
DhE2	Severe: slope	Severe: slope	Moderate: kaolinitic clay in subsoil.	Severe: slope

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mapping units may have different properties and limitations, and for this reason, it is necessary to follow carefully the instructions for referring the first column of this table]

Light industry	Recreational facilities: Campsites	Recreational facilities: Picnic areas	Recreational facilities: Playgrounds	Recreational facilities: Paths and trails
Slight	Moderate: sandy surface layer.	Moderate: sandy surface layer.	Moderate: sandy surface layer; slope.	Moderate: sandy surface layer.
Moderate: slope	Moderate: sandy surface layer.	Moderate: sandy surface layer.	Severe: slope	Moderate: sandy surface layer.
Severe: slope	Moderate: slope	Moderate: slope	Severe: slope	Moderate: sandy surface layer.
Severe: flooding	Severe: flooding	Moderate: flooding; sandy surface layer.	Moderate: flooding; sandy surface layer.	Moderate: flooding; sandy surface layer.
Moderate: slope	Moderate: cobblestones	Slight	Moderate: cobblestones; slope.	Moderate: cobblestones.
Slight	Slight	Slight	Moderate: slope	Slight.
Moderate: slope	Slight to moderate: slope.	Slight to moderate: slope.	Severe: slope	Slight.
Severe: slope	Moderate to severe: slope.	Moderate to severe: slope.	Severe: slope	Moderate: slope.
Slight	Moderate: sandy clay loam surface layer; slope.	Moderate: sandy clay loam surface layer; slope.	Moderate: sandy clay loam surface layer; slope.	Moderate: sandy clay loam surface layer; slope.
Moderate: slope	Moderate: sandy clay loam surface layer; slope.	Moderate: sandy clay loam surface layer; slope.	Severe: slope	Moderate: sandy clay loam surface layer.
Severe: slope	Moderate to severe: slope.	Moderate to severe: slope.	Severe: slope	Moderate: sandy clay loam surface layer.
Severe: wetness; flooding.	Severe: wetness; flooding.	Moderate: wetness; flooding.	Moderate: flooding; wetness.	Moderate: flooding; wetness.
Severe: flooding	Severe: flooding	Moderate: flooding	Moderate: flooding	Moderate: flooding.
Moderate: moderate shrink-swell potential.	Slight	Slight	Moderate: slope	Slight.
Moderate: moderate shrink-swell potential.	Slight to moderate: slope.	Slight to moderate: slope.	Severe: slope	Slight.
Moderate: moderate shrink-swell potential.	Moderate: clay loam surface layer.	Moderate: clay loam surface layer.	Severe: slope	Moderate: clay loam surface layer.
Severe: slope	Severe: slope	Severe: slope	Severe: slope	Moderate: clay loam surface layer; slope.

TABLE 8.—*Degree and kind of limitations*

Soil series and map symbols	Sewage disposal systems		Sanitary landfill[1]	Dwellings without basements
	Septic tank absorption fields	Sewage lagoons		
Enon:				
EjB2	Severe: slow permeability.	Moderate: slope	Severe: clayey subsoil	Severe: high shrink-swell potential.
EjC2, EwD. The Urban land part of EwD is too variable to be rated.	Severe: slow permeability.	Severe: slope	Severe: clayey subsoil	Severe: high shrink-swell potential.
Esto: EgE	Severe: slow permeability.	Severe: slope	Moderate: slope	Severe: slope
Gwinnett: GgF2	Severe: slope	Severe: slope	Severe: slope	Severe: slope
Helena:				
HYB2	Severe: slow permeability.	Moderate: slope	Severe: clayey subsoil; seasonal high water table.	Severe: high shrink-swell potential.
HOC2	Severe: slow permeability.	Severe: slope	Severe: clayey subsoil; seasonal high water table.	Severe: high shrink-swell potential.
Iredell: IcB	Severe: slow permeability.	Moderate: slope	Severe: seasonal high water table; clayey subsoil.	Severe: seasonal high water table; high shrink-swell potential.
Lakeland:				
LpC	Slight[2]	Severe: rapid permeability.	Severe: sand to a depth of more than 80 inches.	Slight
LpD	Moderate: slope	Severe: slope; rapid permeability.	Severe: sand to a depth of more than 80 inches.	Moderate: slope
Norfolk:				
NhA	Slight	Moderate: moderate permeability.	Slight	Slight
NhB	Slight	Moderate: slope	Slight	Slight
NhC	Slight to moderate: slope.	Severe: slope	Slight	Slight to moderate: slope.
Orangeburg:				
OeB	Slight	Moderate: moderate permeability.	Slight	Slight
OeC	Slight to moderate: slope.	Severe: slope	Slight	Slight to moderate: slope.
OeE	Moderate to severe: slope.	Severe: slope	Slight	Moderate to severe: slope.
Pacolet: PfE	Severe: slope	Severe: slope	Moderate: clayey subsoil; coarse fragments in substratum.	Moderate to severe: slope.
Red Bay:				
RgB	Slight	Moderate: moderate permeability.	Slight	Slight
RhC2	Slight to moderate: slope.	Severe: slope	Slight	Slight to moderate: slope.
*Starr:				
Sen. For the Toccoa part, see the Toccoa series.	Severe: seasonal wetness because of depressional relief.	Severe: moderately rapid permeability.	Slight to moderate: depressional relief.	Moderate to severe: depressional relief.
Starr part of Cst	Severe: flooding	Severe: flooding	Severe: flooding	Severe: flooding

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Light industry	Recreational facilities: Campsites	Recreational facilities: Picnic areas	Recreational facilities: Playgrounds	Recreational facilities: Paths and trails
Severe: clayey subsoil	Moderate: slow permeability.	Slight	Moderate: slope	Slight.
Severe: clayey subsoil; slope.	Moderate: slope; slow permeability.	Moderate: slope	Severe: slope	Slight.
Severe: slope	Moderate to severe: slope.	Moderate to severe: slope.	Severe: slope	Moderate: slope.
Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope.
Severe: seasonal high water table; high shrink-swell potential.	Moderate: slow permeability.	Slight	Moderate: slope	Slight.
Severe: high shrink-swell potential.	Slight to moderate: slope.	Slight to moderate: slope.	Severe: slope	Slight.
Severe: high shrink-swell potential.	Severe: seasonal high water table.	Moderate: seasonal high water table.	Severe: seasonal high water table.	Moderate: seasonal high water table.
Moderate: slope	Severe: sandy surface layer.	Severe: sandy surface layer.	Severe: sandy surface layer.	Severe: sandy surface layer.
Severe: slope	Severe: sandy surface layer.	Severe: sandy surface layer.	Severe: sandy surface layer.	Severe: sandy surface layer.
Slight	Slight	Slight	Slight	Slight.
Slight	Slight	Slight	Moderate: slope	Slight.
Moderate: slope	Slight to moderate: slope.	Slight to moderate: slope.	Severe: slope	Slight.
Slight	Slight	Slight	Moderate: slope	Slight.
Moderate: slope	Slight to moderate: slope.	Slight to moderate: slope.	Severe: slope	Slight.
Severe: slope	Moderate to severe: slope.	Moderate to severe: slope.	Severe: slope	Moderate: slope.
Severe: slope	Moderate to severe: slope.	Moderate to severe: slope.	Severe: slope	Moderate: slope.
Slight	Slight	Slight	Moderate: slope	Slight.
Moderate: slope	Slight to moderate: slope.	Slight to moderate: slope.	Severe: slope	Slight.
Slight to moderate: depressional relief.	Slight	Slight	Slight	Slight.
Severe: flooding	Severe: flooding	Moderate: flooding	Moderate: flooding	Moderate: flooding.

TABLE 8.—*Degree and kind of limitations*

Soil series and map symbols	Sewage disposal systems		Sanitary landfill[1]	Dwellings without basements
	Septic tank absorption fields	Sewage lagoons		
Susquehanna: SiD	Severe: very slow permeability.	Severe: slope	Severe: high shrink-swell potential; clayey subsoil.	Severe: high shrink-swell potential.
Toccoa:				
Toccoa part of Cot	Severe: flooding; seasonal high water table.	Moderate: moderately rapid permeability.	Severe: flooding; seasonal high water table.	Severe: flooding; seasonal high water table.
Toccoa part of Sen	Severe: flooding; seasonal high water table.	Moderate: moderately rapid permeability.	Severe: flooding; seasonal high water table.	Severe: flooding; seasonal high water table.
Toccoa soils are mapped only in undifferentiated groups with Congaree and Starr soils.				
Urban land. Mapped only in complexes with Davidson and Enon soils; onsite examination is needed for limitations.				
Vance:				
VaB2	Severe: permeability	Moderate: slope	Severe: clayey subsoil	Moderate: moderate shrink-swell potential.
VaC2	Severe: slow permeability.	Moderate to severe: slope.	Severe: clayey subsoil	Moderate: moderate shrink-swell potential.
VaE2	Severe: slow permeability; slope.	Severe: slope	Severe: clayey subsoil	Severe: slope
VbC2	Severe: slow permeability.	Moderate to severe: slope.	Severe: clayey subsoil	Moderate: moderate shrink-swell potential.
Vaucluse: VeC	Severe: slow permeability.	Moderate to severe: slope.	Slight	Slight to moderate: slope.
Wehadkee: Whs	Severe: flooding; wetness.	Severe: flooding; wetness.	Severe: flooding; wetness.	Severe: flooding; wetness.
Wilkes:				
WiC2	Severe: moderately slow permeability.	Severe: slope; shallow to weathered rock.	Severe: shallow to weathered rock.	Moderate: shallow to weathered rock.
WiE	Severe: moderately slow permeability.	Severe: slope	Severe: shallow to weathered rock.	Severe: slope

[1] Onsite deep studies of the underlying strata, water tables, and hazards of aquifer pollution and drainage into ground water need to be made for land fills deeper than 5 or 6 feet.

sistance to piping and erosion. The best borrow material is free of stones or rocks and thick enough for easy excavation.

Drainage for crops and pasture is affected by such soil properties as permeability, texture, and structure; depth to claypan, rock, or other layers that influence rate of water movement; depth to the water table; slope; stability in ditchbanks; susceptibility to stream overflow; salinity or alkalinity; and availability of outlets for drainage.

Irrigation of a soil is affected by such features as slope; susceptibility to water erosion or soil blowing; soil texture; content of stones; depth of rooting zone; rate of water intake at the surface; permeability of soil layers below the surface layer and in fragipans or other layers that restrict movement of water; amount of water held available to plants; and need for drainage, or depth to water table or bedrock. The features in table 7 are listed with the assumption that ample conservation measures have

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Light industry	Recreational facilities			
	Campsites	Picnic areas	Playgrounds	Paths and trails
Severe: high shrink-swell potential.	Severe: very slow permeability.	Moderate: wetness.	Severe: very slow permeability.	Moderate: wetness.
Severe: flooding; seasonal high water table.	Severe: flooding.	Moderate: flooding.	Moderate: flooding.	Moderate: flooding.
Severe: flooding; seasonal high water table.	Moderate: seasonal high water table.	Moderate: seasonal high water table.	Moderate: seasonal high water table.	Slight.
Moderate: moderate shrink-swell potential.	Moderate: slow permeability.	Slight.	Moderate: slope.	Slight.
Moderate: moderate shrink-swell potential.	Slight to moderate: slope.	Slight to moderate: slope.	Severe: slope.	Slight.
Severe: slope.	Moderate to severe: slope.	Moderate to severe: slope.	Severe: slope.	Moderate: slope.
Moderate: moderate shrink-swell potential.	Moderate: sandy clay loam surface layer.	Moderate: sandy clay loam surface layer.	Severe: slope.	Moderate: sandy clay loam surface layer.
Moderate: slope.	Moderate: slope; slow permeability.	Slight to moderate: slope.	Severe: slope.	Slight.
Severe: flooding; wetness.	Severe: flooding; wetness.	Severe: flooding; wetness.	Severe: flooding; wetness.	Severe: flooding; wetness.
Severe: shallow to weathered rock.	Slight to moderate: slope.	Slight to moderate: slope.	Severe: slope.	Slight.
Severe: shallow to weathered rock; slope.	Moderate to severe: slope.	Moderate to severe: slope.	Severe: slope.	Moderate: slope.

[2] Possible contamination of shallow water supply because of rapid permeability.

been established to assure that soil losses do not exceed allowable amounts.

Terraces and diversions are embankments, or ridges, constructed across the slope to intercept runoff so that it soaks into the soil or flows slowly to a prepared outlet. Features that affect suitability of a soil for terraces are uniformity and steepness of slope; depth to bedrock or other unfavorable material; presence of stones; permeability; and resistance to water erosion, soil slipping, and soil blowing. A soil suitable for these structures provides outlets for runoff and is not difficult to vegetate.

Use of the Soils in Town and Country Planning

In selecting a site for a home, an industry, a sewage disposal system, recreational uses (*8*), or other nonfarm purposes, the suitability of the soils for the intended use must be determined at the site

being considered. Some of the more common properties affecting the use of the soils for nonfarm purposes are soil texture, reaction, and depth, shrink-swell potential, steepness of slopes, permeability, depth to hard rock and to the water table, and the hazard of flooding. On the basis of these and related characteristics, soil scientists and engineers indicated the degree of limitation of the soils of Baldwin, Jones, and Putnam Counties for specific nonfarm purposes. The degree of limitation and the soil properties affecting the limitations are shown in table 8, which begins on page 60.

The degrees of limitation are slight, moderate, and severe, and they are applied to the soils as they occur naturally. A **slight** degree of limitation indicates that the soils have properties favorable for the specified use and that the limitations are so minor that they can easily be overcome. Good performance can be expected from the soils, and little maintenance is required. **Moderate** indicates that the soils have properties moderately favorable for the specified use and that the limitations can be overcome or modified by planning, design, or special maintenance. **Severe** means that the soils have one or more properties unfavorable for the use. Limitations are difficult and costly to modify or overcome, and they require major soil reclamation, special design, or intensive maintenance.

In the paragraphs that follow, the column headings in table 8 are discussed and the soil properties that have an important effect on the degree of limitation for the specified use are given. The information can be used along with information in other parts of the survey, including the general soil map at the back of the survey, as a guide in planning the use of the soils for these purposes. Before beginning most construction projects, however, an investigation should be made at the site.

Septic tank absorption fields are subsurface systems of tile or perforated pipe that distribute effluent from a septic tank into natural soil. The soil material at a depth between 18 inches and 6 feet is evaluated. The soil properties considered are those that affect both absorption of effluent and construction and operation of the system. Properties that affect absorption are permeability, depth to water table or rock, and susceptibility to flooding. Slope is a soil property that affects difficulty of layout and construction and also the risk of soil erosion, lateral seepage, and downslope flow of effluent. Large rocks or boulders increase construction costs.

Sewage lagoons are shallow ponds constructed to hold sewage within a depth of 2 to 5 feet long enough for bacteria to decompose the solids. A lagoon has a nearly level floor, and sides or embankments of compacted soil material. The assumptions made are that the embankment is compacted to medium density and that the pond is protected from flooding. Properties are considered that affect the pond floor and the embankment. Those that affect the pond floor are permeability, organic matter, and slope, and if the floor needs to be leveled, depth to bedrock is important. The soil properties that affect the embankment are the engineering properties of the embankment material as interpreted from the Unified Soil Classification and the amount of stones, if any, that influence the ease of excavation and compaction of the embankment material.

Sanitary landfill is a method of disposing of refuse in dug trenches. The waste is spread in thin layers, compacted, and covered with soil throughout the disposal period. Landfill areas are subject to heavy vehicular traffic. Some soil properties that affect suitability for landfill are ease of excavation, hazard of polluting ground water, and trafficability. The best soils have moderately slow permeability, withstand heavy traffic, and are friable and easy to excavate. Unless otherwise stated, the ratings in table 8 apply only to a depth of about 6 feet, and therefore a limitation of slight or moderate may not be valid if trenches are to be much deeper than that. For some soils, reliable predictions can be made to a depth of 10 or 15 feet, but regardless of that, every site should be investigated before it is selected.

Dwellings without basements are not more than three stories high and are supported by foundation footings placed in undisturbed soil. The features that affect the degree of limitation of a soil for this purpose are those that relate to capacity to support load and resist settlement under load, and those that relate to ease of excavation. Soil properties that affect capacity to support load are wetness, susceptibility to flooding, density, plasticity, texture, and shrink-swell potential. Those that affect excavation are wetness, slope, depth to bedrock, and content of stones and rocks.

Limitations for light industry are for the undisturbed soils that are used to support building foundations. Emphasis is on foundations, ease of excavation for underground utilities, and corrosion potential to uncoated steel pipe. The undisturbed soil is evaluated for spread footing foundations for buildings less than three stories high or foundation loads not in excess of that weight. Properties affecting load-supporting capacity and settlement under load are wetness, flooding, texture, plasticity, density, and shrink-swell behavior. Properties affecting excavation are wetness, flooding, slope, and depth to bedrock. Properties affecting corrosion of buried uncoated steel pipe are wetness, texture, total acidity, and electrical resistivity.

Campsites are used intensively for tents and small camp trailers and the accompanying activities of outdoor living. Little preparation of the site is required, other than shaping and leveling for tent and parking areas. Campsites are subject to heavy foot traffic and limited vehicular traffic. The best soils have mild slopes, good drainage, a surface free of rocks and coarse fragments, freedom from flooding during periods of heavy use, and a surface that is firm after rains but not dusty when dry.

Picnic areas are attractive natural or landscaped tracts used mainly for preparing meals and eating outdoors. These areas are subject to heavy foot traffic. Most of the vehicular traffic, however, is confined to access roads. The best soils are firm when wet but not dusty when dry, are free of flooding during the season of use, and do not have slopes or stoniness that greatly increase cost of leveling sites or of building access roads.

Playgrounds are areas used intensively for baseball, football, badminton, and similar organized games. Soils suitable for this use have to withstand intensive foot traffic. The best soils have a nearly level surface free of coarse fragments and rock outcrops, good drainage, freedom from flooding during periods of heavy use, and a surface that is firm after rains but not dusty when dry. If grading and leveling are required, depth to rock is important.

Paths and trails are used for local and cross-country travel by foot or horseback. Design and layout should require little or no cutting and filling. The best soils are at least moderately well drained, and firm when wet but not dusty when dry, are flooded not more than once during the season of use, and have slopes of less than 15 percent. There are few or no rocks or stones on the surface.

Formation and Classification of the Soils

This section lists the factors of soil formation and discusses the effect these factors have on the soils of Baldwin, Jones, and Putnam Counties. It also explains the current system of soil classification. Table 9 places the soil series in some of the higher categories of the current system. The soil series in the three counties are described in detail in the section, "Description of the Soils."

Formation of the Soils

Soils are formed when parent material, topography or relief, plants and animals, and climate interact for long periods of time. This combination of factors largely determines the properties of the soil at any given point on the earth. These factors have influenced the formation of each soil in Baldwin, Jones, and Putnam Counties.

Climate and vegetation are the principal active forces that gradually alter the parent material to form a soil. Topography, though not active, mainly influences soil drainage and runoff, but it also influences soil temperature. Climate, vegetation, and topography act over long periods of time to bring about changes in parent material. The five factors of soil formation are discussed in the paragraphs that follow.

Parent material

Parent material is the unconsolidated mass or raw material in which a soil forms. It is converted by soil-forming processes to soil and is largely responsible for the chemical and mineralogical composition of the soil. In Baldwin, Jones, and Putnam Counties, the parent material is quite variable and consists of material weathered from igneous and metamorphic rocks and of sedimentary material deposited by water.

Beginning at the Oconee River, near the northeast corner of Putnam County, and extending across the southern part of Putnam County and the northern part of Baldwin and Jones Counties is an area 12 to 15 miles wide that makes up about half the acreage of the three counties. In this area, the parent material consists of saprolite of mostly metamorphic rocks, such as biotite gneiss and schist, that are probably Precambrian (*2*, *3*, *4*). There are small areas of muscovite granite, faults and dikes of dolerite of the Triassic period, muscovite schist, granite gneiss, diorite injection gneiss, and a narrow band of schist of the Little River Series. The Cecil, Pacolet, Vance, Enon, and Helena soils formed in these materials.

TABLE 9.—*Soil series classified according to the current system of classification*[1]

Series[1]	Family	Subgroup	Order
Ailey	Loamy, siliceous, thermic	Arenic Fragiudults	Ultisols.
Buncombe	Mixed, thermic	Typic Udipsamments	Entisols.
Cecil	Clayey, kaolinitic, thermic	Typic Hapludults	Ultisols.
Chewacla	Fine-loamy, mixed, thermic	Fluvaquentic Dystrochrepts	Inceptisols.
Congaree	Fine-loamy, mixed, nonacid, thermic	Typic Udifluvents	Entisols.
Davidson	Clayey, kaolinitic, thermic (oxidic)	Rhodic Paleudults	Ultisols.
Enon	Fine, mixed, thermic	Ultic Hapludalfs	Alfisols.
Esto	Clayey, kaolinitic, thermic	Typic Paleudults	Ultisols.
Gwinnett	Clayey, kaolinitic, thermic	Typic Rhodudults	Ultisols.
Helena	Clayey, mixed, thermic	Aquic Hapludults	Ultisols.
Iredell	Fine, montmorillonitic, thermic	Typic Hapludalfs	Alfisols.
Lakeland	Thermic, coated	Typic Quartzipsamments	Entisols.
Norfolk	Fine-loamy, siliceous, thermic	Typic Paleudults	Ultisols.
Orangeburg	Fine-loamy, siliceous, thermic	Typic Paleudults	Ultisols.
Pacolet	Clayey, kaolinitic, thermic	Typic Hapludults	Ultisols.
Red Bay	Fine-loamy, siliceous, thermic	Rhodic Paleudults	Ultisols.
Starr	Fine-loamy, mixed, thermic	Fluventic Dystrochrepts	Inceptisols.
Susquehanna	Fine, montmorillonitic, thermic	Vertic Paleudalfs	Alfisols.
Toccoa	Coarse-loamy, mixed, nonacid, thermic	Typic Udifluvents	Entisols.
Vance	Clayey, mixed, thermic	Typic Hapludults	Ultisols.
Vaucluse	Fine-loamy, siliceous, thermic	Fragic Paleudults	Ultisols.
Wehadkee	Fine-loamy, mixed, nonacid, thermic	Typic Fluvaquents	Entisols.
Wilkes	Loamy, mixed, thermic, shallow	Typic Hapludalfs	Alfisols.

[1] Series classification as of March 17, 1972.

Saprolite of igneous rocks predominates in the northern half of Putnam and Jones Counties. This area makes up about one-fifth of the acreage of the three counties. The parent material weathered mainly from hornblende gneiss, diorite, gneiss, diorite gneiss, gabbro, and some injection gneisses. The Davidson, Gwinnett, Wilkes, and Iredell soils formed in this parent material.

In the southern part of Baldwin and Jones Counties, the parent material is largely sedimentary. It has been transported from other areas by water and deposited over the residuum of metamorphic and igneous rocks. This deposit is very thin along the northern part of the survey area but thickens to the south. It ranges up to 200 feet thick along the southern boundary. In this part are the Norfolk and Orangeburg soils that formed in loamy sediments of the Barnwell Formation, which is of Eocene age, and underlain by the Tuscaloosa Formation on wide interstream ridges.

The Chewacla and Congaree soils are on the flood plains of the larger streams. Their parent material is alluvium that consists mostly of fine sediments carried in suspension and then deposited by high floodwater.

Topography

Topography, or shape of the landscape, affects soil formation through its influence on drainage, erosion, soil temperature, and plant cover. The survey area lies on a plateau that is dissected by streams cutting into the land surface in a dendritic pattern. The soils on uplands in the three counties have slopes of 2 to 35 percent.

Most of the soils are well drained, except those that lie along the broader flood plains and in seepage areas at the base of slopes. The landscape consists mainly of broad ridges and long, gently sloping to strongly sloping areas. Some places have short, irregular, steep slopes and escarpments, and in these places the soils are comparatively shallow to bedrock. In contrast, gently sloping soils in broad areas are deep to bedrock. Stones, boulders, and outcrops of bedrock also are associated with shallow, steep soils.

The Davidson and Gwinnett soils are examples of well-drained soils that formed in areas where runoff is medium. The Iredell soils are moderately well drained soils that formed in very gently sloping areas where runoff is medium. The Wehadkee soils formed on level flood plains where runoff is very slow. These soils are wet.

Plants and animals

The kinds and numbers of plants and animals living on and in the soil are determined mainly by soil features that are the result of climate and, to a lesser degree, features that result from the kind of parent material, topography, and age of the soil. Micro-organisms aid in the weathering of rock and in the decomposition of organic matter. Each cubic foot of soil contains millions of bacteria, fungi, insects, and other small plants and animals that cause a continuous change in the physical and chemical properties of the soils.

The larger plants supply organic matter. They also transfer elements from the subsurface layers to the surface by assimilating these elements into plant tissue and then depositing this tissue on the surface of the soil as fallen fruits, nuts, leaves, and stems. Earthworms and other small invertebrates carry on slow but continuous soil mixing.

In these three counties, the native vegetation was chiefly pine and oak on uplands and yellow-poplar, sweetgum, and water-tolerant oaks in the low, wet areas. This vegetation contributed varying amounts of organic matter.

Man's activities have drastically changed the kind and number of living organisms that affect soil formation. By clearing forests, cultivating soils, and accelerating erosion, man has affected the rate of soil formation. Few results of these changes can be seen, and probably some of the results will not be evident for many centuries.

Climate

Climate affects the formation of soils through its influence on the rate of weathering of rocks and on the decomposition of minerals and organic matter. It also affects biological activity in the soils and the leaching and movement of weathered materials.

Baldwin, Jones, and Putnam Counties have a moist, temperate climate that is presumed to be similar to that under which the soils formed. The warm climate and moist soils promote rapid chemical and biological action. The large amount of rainfall causes the soils to be highly leached and low in organic-matter content. Because of the leaching of such basic elements as calcium, magnesium, and sodium, and their replacement by hydrogen, the soils tend to be acid. The translocation of solid material as bases and of less soluble material as colloidal substance has resulted in soils that are less fertile now than when they were first formed.

Time

The length of time required for a well-developed profile to form depends largely on other factors of soil formation. Usually, less time is required if the climate is warm and humid, if the parent material is loamy textured, and if the vegetation is luxuriant.

The Buncombe soils, which formed in local alluvium, are an example of young soils that have little horizon development. These soils retain most of the characteristics of the parent material. The Lakeland soils probably will never have well-expressed horizons because their parent material has a high percentage of quartz sand. The Esto and Susquehanna soils have been in place long enough for the development of a well-defined profile, although it is not so well developed as the profiles of some other soils in the three counties. Profile development is somewhat retarded by slow permeability of parent material and lack of much movement of water in the profile. The Norfolk and Orangeburg soils, which formed in finer textured material than Lakeland soils, have a well-developed profile. They have been in place a long time, and their subsoil is moderately permeable. They have an acid B horizon that has an accumulation of clay.

Classification of the Soils

Soils are classified so that we can more easily remember their significant characteristics. Classification enables us to assemble knowledge about the soils, to see their relationship to one another and to the whole environment, and to develop principles that help us to understand their behavior and their response to manipulation. First through classification, and then through use of soil maps, we can apply our knowledge of soils to specific fields and other tracts of land.

The narrow categories of classification, such as those used in detailed soil surveys, allow us to organize and apply knowledge about soils in managing farms, fields, and woodlands; in developing rural areas; in engineering work; and in many other ways. Soils are placed in broad classes to facilitate study and comparison in large areas, such as countries and continents.

The system of soil classification currently used was adopted by the National Cooperative Soil Survey in 1965 (*6*). Because this system is under continual study, readers interested in developments of the current system should refer to the latest literature available.

The current system of classification has six categories. Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series. In this system the criteria used as a basis for classification are soil properties that are observable and measurable. The properties are chosen, however, so that the soils of similar genesis, or mode of origin, are grouped. In table 9, the soils of Baldwin, Jones, and Putnam Counties are placed in four categories of the current system. Classes of the current system are briefly defined in the following paragraphs.

ORDER.—Ten soil orders are recognized. The properties used to differentiate among soil orders are those that tend to give broad climatic groupings of soils. The two exceptions, the Entisols and Histosols, occur in many different climates. Each order is named with a word of three or four syllables ending in *sol* (Ent-i-sol).

SUBORDER.—Each order is divided into suborders that are based primarily on those soil characteristics that seem to produce classes with the greatest genetic similarity. The suborders narrow the broad climatic range permitted in the orders. The soil properties used to separate suborders are mainly those that reflect either the presence or absence of waterlogging, or soil differences resulting from the climate or vegetation. The names of suborders have two syllables. The last syllable indicates the order.

GREAT GROUP.—Soil suborders are separated into great groups on the basis of uniformity in the kinds and sequence of major soil horizons and features. The horizons used to make separations are those in which clay, iron, or humus have accumulated; those that have pans that interfere with growth of roots, movement of water, or both; and thick, dark-colored surface horizons. The features used are the self-mulching properties of clay, soil temperature, major differences in chemical composition (mainly calcium, magnesium, sodium, and potassium), dark-red and dark-brown colors associated with basic rocks, and the like. The names of great groups have three or four syllables and are made by adding a prefix to the name of the suborder.

SUBGROUP.—Great groups are divided into subgroups, one representing the central (typic) segment of the group, and others called intergrades that have properties of the group and also one or more properties of another great group, suborder, or order. Subgroups may also be made in those instances where soil properties intergrade outside of the range of any other great group, suborder, or order. The names of subgroups are derived by placing one or more adjectives before the name of the great group.

FAMILY.—Soil families are separated within a subgroup primarily on the basis of properties important to the growth of plants or on the behavior of soils when used for engineering. Among the properties considered are texture, mineralogy, reaction, soil temperature, permeability, thickness of horizons, and consistence. A family name consists of a series of adjectives preceding the subgroup name. The adjectives are the class names for texture, mineralogy, and so on, that are used to differentiate families.

SERIES.—The series is a narrower category within the family. All the soils of a given series formed from a particular kind of parent material and have genetic horizons that, except for texture of the surface layer, are similar in differentiating characteristics and in arrangement in the soil profile. Among the differentiating characteristics are color, structure, reaction, consistence, and mineralogical and chemical composition.

General Nature of the Counties

Baldwin County was organized from original territory in 1803. It was divided into land districts and lots, and the lots were laid out to coincide with the original line between Baldwin and Wilkinson Counties. Milledgeville, the county seat, was the State capital from 1803 to 1868. Hardwick, Stevens Pottery, and Coopers are unincorporated towns in the county. The population was 21,294 in 1960 and 34,240 in 1970.

Jones County was organized in 1807 from a part of Baldwin County. Some territory from Putnam County was added to Jones County in 1810, and a part was taken off in the formation of Bibb County in 1822. Gray is the county seat, and other towns are Haddock, James, Bradley, Wayside, Round Oak, and Clinton, the oldest settlement and the county seat until 1907. The population of Jones County was 8,468 in 1960 and 12,218 in 1970.

Putnam County was formed from a part of Baldwin County in 1807. Eatonton is the county seat. The population was 7,798 in 1960 and 8,394 in 1970.

Manufacturing is diversified among 40 plants in the survey area. Among the products manufactured or processed in the three counties are textiles, clay products, mobile homes, aluminum cookware, con-

Figure 13.—Lake Sinclair provides recreation.

crete, stone, lumber, and food products. In 1970, approximately 4,500 people were employed in manufacturing. The largest number is in the textile and clay products industries. About 4,000 people are employed at the Central State Hospital. Electricity is generated at Sinclair Dam in Baldwin and Plant Harlee Branch in Putnam County.

Lake Sinclair, impounded by Sinclair Dam on the Oconee River, 4 miles north of Milledgeville, provides recreation opportunities for the people of the area and surrounding counties (fig. 13). Lake Sinclair Recreation Area is operated by the Forest Service in the southern part of Putnam County; Oconee Springs State Park is in the southeastern part of Putnam County; and Rock Eagle 4-H Club Center is in the northern part of Putnam County.

Climate[6]

Baldwin, Jones, and Putnam Counties, which are near the geographical center of the State, lie along the southern border of the Piedmont Plateau, and the southern part of Baldwin and Jones Counties reaches into the sandhills. The climate is temperate. Summers are warm, winters are moderately cold, and precipitation is normally adequate. Autumn usually brings some of the most pleasant weather. In this season rainfall is at a minimum and long periods of mild sunny days and cool nights are quite common. Summer nights are comfortable. Spring is a period of rapidly changing weather, when the normal rise in temperature is frequently interrupted by late-arriving cold fronts that may produce potentially stormy conditions.

Table 10 gives temperature and precipitation data, and table 11 gives the probabilities of low temperatures in spring and fall.

Summer weather begins late in May, and maximum temperatures reach or exceed 90° F on 50 to 65 percent of the days in the period from late in May to mid-September. In most summers, the maximum temperatures reach the upper 90's on a few days, and in 2 summers out of 10, they reach 100° on at least 4 days. The average drop in temperature from maximum to minimum is 20° to 25°, and early morning temperatures are normally in the middle or upper 60's.

Cooler weather arrives by late in September, and average daily temperatures drop about 20° in the period September to November. Periods of cold weather that begin in November increase in fre-

[6] Prepared by HORACE S. CARTER, climatologist for Georgia, National Weather Service, U.S. Department of Commerce.

TABLE 10.—*Temperature and precipitation*

Month	Temperature				Precipitation		
	Average daily maximum	Average daily minimum	Two years in 10 will have at least 4 days with—		Average	One year in 10 will have—	
			Maximum temperature equal to or higher than—	Minimum temperature equal to or lower than—		Less than—	More than—
	°F	°F	°F	°F	Inches	Inches	Inches
January	57.2	33.2	74	19	3.99	1.3	7.2
February	60.0	34.9	76	20	4.52	1.6	7.8
March	66.7	40.4	82	27	5.05	1.8	9.0
April	76.4	49.2	87	35	3.46	1.3	7.1
May	83.7	57.7	93	45	4.36	1.0	9.1
June	89.1	65.7	98	57	3.62	1.2	6.8
July	90.5	69.0	98	62	5.32	2.3	8.4
August	90.3	68.1	98	60	3.78	1.5	6.9
September	85.3	62.7	96	53	3.19	.9	6.1
October	76.9	50.4	86	35	2.26	.4	5.5
November	67.1	39.5	80	26	2.63	.7	6.5
December	58.2	33.1	74	20	4.24	1.2	8.0
Year	75.1	50.3	[1] 100	[1] 15	46.42	37.1	60.2

[1] The extreme temperature that will be equaled or exceeded (minimum equal or lower) on at least 4 days in 2 years out of 10.

TABLE 11.—*Probabilities of low temperatures in spring and fall*

Probability	Dates for given probability and temperature		
	24° F or lower	28° F or lower	32° F or lower
Spring:			
1 year in 10 later than	March 21	March 30	April 15
2 years in 10 later than	March 7	March 24	April 10
5 years in 10 later than	February 22	March 17	March 25
Fall:			
1 year in 10 earlier than	November 16	November 1	October 25
2 years in 10 earlier than	November 20	November 5	October 27
5 years in 10 earlier than	December 1	November 16	November 5

quency and intensity as midwinter approaches. Freezing occurs on slightly more than half the days in the period December through February in contrast to about 1 day out of 4 in November and March. The minimum temperature is less than 20° on 1 or more days in most winters but less than 10° in an occasional winter. The 10° temperature is caused by a strong outburst of cold air. Winter afternoons usually warm up to the middle 50's or higher.

In spring and summer, rainfall occurs mostly as showers and thundershowers, and daily amounts vary greatly from place to place. Cold-season rainfall results almost entirely from low pressure storms and fronts, and is fairly uniform over the survey area. It increases both in frequency and amount in the period November to December and continues about the same throughout the winter. Normally about 28 percent of the annual rainfall occurs in spring, slightly more than 27 percent in winter, about 27 percent in summer, and 17 percent in fall. The wettest month is July, when rainfall averages 5.32 inches; the next wettest month is normally March when rainfall averages about 5 inches; and the driest month is October when rainfall averages 2.26 inches. On an average of 8 days in July and 6 days in June and August, 0.10 inch or more of rainfall can be expected.

The last freeze in spring comes by the end of March, on the average, but the threat of a late freeze is not over until mid-April. The first freeze in fall occurs by November in 2 years out of 3.

In spring thunderstorms increase and reach a maximum in summer, when they occur on more than a third of the days. In winter they are likely on only 1 day each month. The threat of tornadoes is greatest in spring.

Average windspeed ranges from almost 10 miles per hour early in spring to about 7 miles per hour in midsummer. Directions are quite variable but are more northerly in fall and winter and southerly in spring and summer.

Average relative humidity ranges from 80 to 92 percent in early morning and from 48 to 58 percent in early afternoon. Both morning and afternoon averages are lower in spring and higher in summer.

Geology, Physiography, and Drainage

Putnam County lies entirely within the Southern Piedmont Major Land Resource Area. The western part of the county is underlain by dark-colored basic rocks, such as diorite, gabbro, and hornblende gneiss; the eastern part by granite, gneiss, schist, and other metamorphic rocks (*2*, *3*, *4*).

The geology in the northern two-thirds of Jones County is similar to that of Putnam County, but the southern part of Jones County is covered by a mantle of Coastal Plain material ranging from very thin at the margin to a thickness of 200 feet. The underlying rock in Baldwin County is similar to that in the eastern part of Jones and Putnam Counties, but the southern and eastern parts are covered by Coastal Plain material.

The elevation of the survey area ranges from 235 to more than 600 feet above sea level. The lowest point is where the Oconee River flows out of Baldwin County, and the highest is in the northern part of the survey area in Putnam County.

The survey area is drained mainly by three major rivers: the Oconee River, Little River, and Ocmulgee River. Lake Sinclair on the Oconee River is the largest body of water. The Oconee River flows southward at the eastern edge of Putnam County and then across Baldwin County. The Little River and Cedar Creek separate Putnam and Baldwin Counties. The Ocmulgee River is the western boundary of Jones County. Generally, streams have cut their courses to about 100 feet below the crest of the intervening ridges.

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Glossary

Alluvium. Soil material, such as sand, silt, or clay, that has been deposited on land by streams.

Available water capacity (also termed available moisture capacity). The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil.

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Cobblestone. A rounded or partly rounded fragment of rock, 3 to 10 inches in diameter.

Concretions. Grains, pellets, or nodules of various sizes, shapes, and colors consisting of concentrations of compounds, or of soil grains cemented together. The composition of some concretions is unlike that of the surrounding soil. Calcium carbonate and iron oxide are examples of material commonly found in concretions.

Consistence, soil. The feel of the soil and the ease with which a lump can be crushed by the fingers. Terms commonly used to describe consistence are—

Loose. Noncoherent when dry or moist; does not hold together in a mass.

Friable.—When moist, crushes easily under gentle pressure between thumb and forefinger and can be pressed together into a lump.

Firm.—When moist, crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.

Plastic.—When wet, readily deformed by moderate pressure but can be pressed into a lump; will form a "wire" when rolled between thumb and forefinger.

Sticky.—When wet, adheres to other material, and tends to stretch somewhat and pull apart, rather than to pull free from other material.

Hard.—When dry, moderately resistant to pressure; can be broken with difficulty between thumb and forefinger.

Soft.—When dry, breaks into powder or individual grains under very slight pressure.

Cemented.—Hard and brittle; little affected by moistening.

Drainage class (natural). Refers to the conditions of frequency and duration of periods of saturation or partial saturation that existed during the development of the soil, as opposed to altered drainage, which is commonly the result of artificial drainage or irrigation but may be caused by the sudden deepening of channels or the blocking of drainage outlets. Seven different classes of natural soil drainage are recognized.

Excessively drained soils are commonly very porous and rapidly permeable and have a low water-holding capacity.

Somewhat excessively drained soils are also very permeable and are free from mottling throughout their profile.

Well-drained soils are nearly free from mottling and are commonly of intermediate texture.

Moderately well drained soils commonly have a slowly permeable layer in or immediately beneath the solum. They have uniform color in the A and upper B horizons and have mottling in the lower B and the C horizons.

Somewhat poorly drained soils are wet for significant periods but not all the time, and some soils commonly have mottling at a depth below 6 to 16 inches.

Poorly drained soils are wet for long periods and are light gray and generally mottled from the surface downward, although mottling may be absent or nearly so in some soils.

Very poorly drained soils are wet nearly all the time. They have a dark-gray or black surface layer and are gray or light gray, with or without mottling, in the deeper parts of the profile.

Flood plain. Nearly level land, consisting of stream sediments, that borders a stream and is subject to flooding unless protected artificially.

Horizon, soil. A layer of soil, approximately parallel to the surface, that has distinct characteristics produced by soil-forming processes. These are the major horizons:

O horizon.—The layer of organic matter on the surface of a mineral soil. This layer consists of decaying plant residues.

A horizon.—The mineral horizon at the surface or just below an O horizon. This horizon is the one in which living organisms are most active and therefore is marked by the accumulation of humus. The horizon may have lost one or more of soluble salts, clay, and sesquioxides (iron and aluminum oxides).

B horizon.—The mineral horizon below an A horizon. The B horizon is in part a layer of change from the overlying A to the underlying C horizon. The B horizon also has distinctive characteristics caused (1) by accumulation of clay, sesquioxides, humus, or some combination of these; (2) by prismatic or blocky structure; (3) by redder or stronger colors than the A horizon; or (4) by some combination of these. Combined A and B horizons are usually called the solum, or true soil. If a soil lacks a B horizon, the A horizon alone is the solum.

C horizon.—The weathered rock material immediately beneath the solum. In most soils this material is presumed to be like that from which the overlying horizons were formed. If the material is known to be different from that in the solum, a Roman numeral precedes the letter C.

R layer.—Consolidated rock beneath the soil. The rock usually underlies a C horizon but may be immediately beneath an A or B horizon.

Mottling, soil. Irregularly marked with spots of different colors that vary in number and size. Mottling in soils usually indicates poor aeration and lack of drainage. Descriptive terms are as follows: Abundance—*few*, *common*, and *many*; size—*fine*, *medium*, and *coarse*; and contrast—*faint*, *distinct*, and *prominent*. The size measurements are these: *fine*, less than 5 millimeters (about 0.2 inch) in diameter along the greatest dimension; *medium*, ranging from 5 millimeters to 15 millimeters (about 0.2 to 0.6 inch) in diameter along the greatest dimension; and *coarse*, more than 15 millimeters (about 0.6 inch) in diameter along the greatest dimension.

Parent material. Disintegrated and partly weathered rock from which soil has formed.

Permeability. The quality that enables the soil to transmit water or air. Terms used to describe permeability are as follows: *very slow*, *slow*, *moderately slow*, *moderate*, *moderately rapid*, *rapid*, and *very rapid*.

Profile, soil. A vertical section of the soil through all its horizons and extending into the parent material.

Reaction, soil. The degree of acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH 7.0 is precisely neutral in reaction because it is neither acid nor alkaline. An acid, or "sour," soil is one that gives an acid reaction; an alkaline soil is one that is alkaline in reaction. In words, the degrees of acidity or alkalinity are expressed thus:

	pH		*pH*
Extremely acid	Below 4.5	Neutral	6.6 to 7.3
Very strongly acid	4.5 to 5.0	Mildly alkaline	7.4 to 7.8
Strongly acid	5.1 to 5.5	Moderately alkaline	7.9 to 8.4
Medium acid	5.6 to 6.0	Strongly alkaline	8.5 to 9.0
Slightly acid	6.1 to 6.5	Very strongly alkaline	9.1 and higher

Relief. The elevations or inequalities of a land surface, considered collectively.

Sand. Individual rock or mineral fragments in a soil that range in diameter from 0.05 to 2.0 millimeters. Most sand grains consist of quartz, but they may be of any mineral composition. The textural class name of any soil that contains 85 percent or more sand and not more than 10 percent clay.

Silt. Individual mineral particles in a soil that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). Soil of the silt textural class is 80 percent or more silt and less than 12 percent clay.

Soil. A natural, three-dimensional body on the earth's surface that supports plants and that has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

Solum. The upper part of a soil profile, above the parent material, in which the processes of soil formation are active. The solum in mature soil includes the A and B horizons. Generally, the characteristics of the material in these horizons are

unlike those of the underlying material. The living roots and other plant and animal life characteristic of the soil are largely confined to the solum.

Structure, soil. The arrangement of primary soil particles into compound particles or clusters that are separated from adjoining aggregates and have properties unlike those of an equal mass of unaggregated primary soil particles. The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular*. *Structureless* soils are either *single grain* (each grain by itself, as in dune sand) or *massive* (the particles adhering together without any regular cleavage, as in many claypans and hardpans).

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Substratum. Technically, the part of the soil below the solum.

Surface soil. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, about 5 to 8 inches in thickness. The plowed layer.

Terrace. An embankment, or ridge, constructed across sloping soils on the contour or at a slight angle to the contour. The terrace intercepts surface runoff so that it may soak into the soil or flow slowly to a prepared outlet without harm. Terraces in fields are generally built so they can be farmed. Terraces intended mainly for drainage have a deep channel that is maintained in permanent sod.

Terrace (geological). An old alluvial plain, ordinarily flat or undulating, bordering a river, lake, or the sea. Stream terraces are frequently called second bottoms, as contrasted to flood plains, and are seldom subject to overflow. Marine terraces were deposited by the sea and are generally wide.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay*, and *clay*. The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."

Tilth, soil. The condition of the soil in relation to the growth of plants, especially soil structure. Good tilth refers to the friable state and is associated with high noncapillary porosity and stable, granular structure. A soil in poor tilth is nonfriable, hard, nonaggregated, and difficult to till.

Upland (geology). Land consisting of material unworked by water in recent geologic time and lying, in general, at a higher elevation than the alluvial plain or stream terrace. Land above the lowlands along rivers.

GUIDE TO MAPPING UNITS

For a full description of a mapping unit, read both the description of the mapping unit and the description of the series to which it belongs. To learn about the management of a capability unit, read the description of the unit and also the introduction to the section in which the unit is described. Other information is given in tables as follows:

Acreage and extent, table 1, page 9.
Woodland suitability groups, table 2, page 31.
Estimated yields, table 3, page 41.
Use of the soils for wildlife, table 4, page 42.
Engineering uses of soils, tables 5, 6, and 7, pages 46 through 57.
Use of the soils in town and country planning, table 8, page 60.

Map symbol	Mapping unit	Page	Capability unit Symbol	Capability unit Page	Woodland suitability group Symbol
AAC	Ailey and Norfolk loamy sands, 2 to 10 percent slopes	10	IVs-2	39	4s2
AgB	Ailey loamy sand, 2 to 6 percent slopes	10	IIIs-2	38	4s2
AgC	Ailey loamy sand, 6 to 10 percent slopes	10	IVs-2	39	4s2
AhD	Ailey soils, 10 to 15 percent slopes	10	VIIe-3	40	4s2
Bfs	Buncombe loamy sand	11	IIIs-1	38	2s8
CAC	Cecil cobbly sandy loam, 2 to 10 percent slopes	12	IVs-1	39	3x7
Cot	Congaree and Toccoa soils	14	IIw-1	36	1o7
Cst	Chewacla and Starr soils	13	IIIw-1	37	1w8
CyB2	Cecil sandy loam, 2 to 6 percent slopes, eroded	12	IIe-1	35	3o7
CyC2	Cecil sandy loam, 6 to 10 percent slopes, eroded	12	IIIe-1	36	3o7
CyE2	Cecil sandy loam, 10 to 25 percent slopes, eroded	12	VIe-1	39	3r8
CZB2	Cecil sandy clay loam, 2 to 6 percent slopes, eroded	12	IIIe-1	36	4c2e
CZC2	Cecil sandy clay loam, 6 to 10 percent slopes, eroded	13	IVe-1	38	4c2e
CZE2	Cecil sandy clay loam, 10 to 25 percent slopes, eroded	13	VIe-1	39	4c3e
DgB2	Davidson loam, 2 to 6 percent slopes, eroded	15	IIe-1	35	3o7
DgC2	Davidson loam, 6 to 10 percent slopes, eroded	15	IIIe-1	36	3o7
DhC2	Davidson clay loam, 6 to 10 percent slopes, eroded	15	IVe-1	38	4c2e
DhE2	Davidson clay loam, 10 to 25 percent slopes, eroded	15	VIe-1	39	4c3e
DyC	Davidson-Urban land complex, 2 to 10 percent slopes	16	-----	--	---
EgE	Esto soils, 10 to 25 percent slopes	18	VIIe-3	40	3o1
EjB2	Enon soils, 2 to 6 percent slopes, eroded	17	IIe-3	36	4o1
EjC2	Enon soils, 6 to 10 percent slopes, eroded	17	IIIe-3	37	4o1
EwD	Enon-Urban land complex, 5 to 12 percent slopes	16	-----	--	---
GgF2	Gwinnett loam, 15 to 35 percent slopes, eroded	18	VIIe-1	40	3r8
HOC2	Helena complex, 6 to 10 percent slopes, eroded	19	IVe-3	38	3w8
HYB2	Helena sandy loam, 2 to 6 percent slopes, eroded	19	IIe-3	36	3w8
IcB	Iredell loam, 2 to 6 percent slopes	20	IIe-4	36	4c2
LpC	Lakeland sand, 2 to 10 percent slopes	21	IVs-2	39	4s2
LpD	Lakeland sand, 10 to 15 percent slopes	21	VIs-1	40	4s2
NhA	Norfolk loamy sand, 0 to 2 percent slopes	22	I-1(C)	34	2o1
NhB	Norfolk loamy sand, 2 to 6 percent slopes	22	IIe-1(C)	35	2o1
NhC	Norfolk loamy sand, 6 to 10 percent slopes	22	IIIe-1(C)	37	2o1
OeB	Orangeburg loamy sand, 2 to 6 percent slopes	23	IIe-1(C)	35	2o1
OeC	Orangeburg loamy sand, 6 to 10 percent slopes	23	IIIe-1(C)	37	2o1
OeE	Orangebbrg loamy sand, 10 to 20 percent slopes	23	VIe-1(C)	40	2o1
PfE	Pacolet sandy loam, 10 to 25 percent slopes	23	VIe-1	39	3r8
RgB	Red Bay loamy sand, 2 to 6 percent slopes	24	IIe-1(C)	35	2o1
RhC2	Red Bay sandy loam, 6 to 10 percent slopes, eroded	24	IIIe-1(C)	37	2o1
Sen	Starr and Toccoa soils	25	I-1	34	1o7
SiD	Susquehanna fine sandy loam, 5 to 15 percent slopes	26	VIe-2	40	3c2
VaB2	Vance sandy loam, 2 to 6 percent slopes, eroded	27	IIe-3	36	3o7
VaC2	Vance sandy loam, 6 to 10 percent slopes, eroded	27	IIIe-3	37	3o7
VaE2	Vance sandy loam, 10 to 25 percent slopes, eroded	27	VIe-1	39	3r8
VbC2	Vance sandy clay loam, 2 to 10 percent slopes, eroded	28	IVe-3	38	4c2e
VeC	Vaucluse loamy sand, 2 to 10 percent slopes	28	IIIe-4	37	3o1
Whs	Wehadkee soils	29	IVw-1	39	1w9
WiC2	Wilkes sandy loam, 2 to 10 percent slopes, eroded	30	IVe-4	38	4o1
WiE	Wilkes soils, 10 to 25 percent slopes	30	VIIe-2	40	4r2

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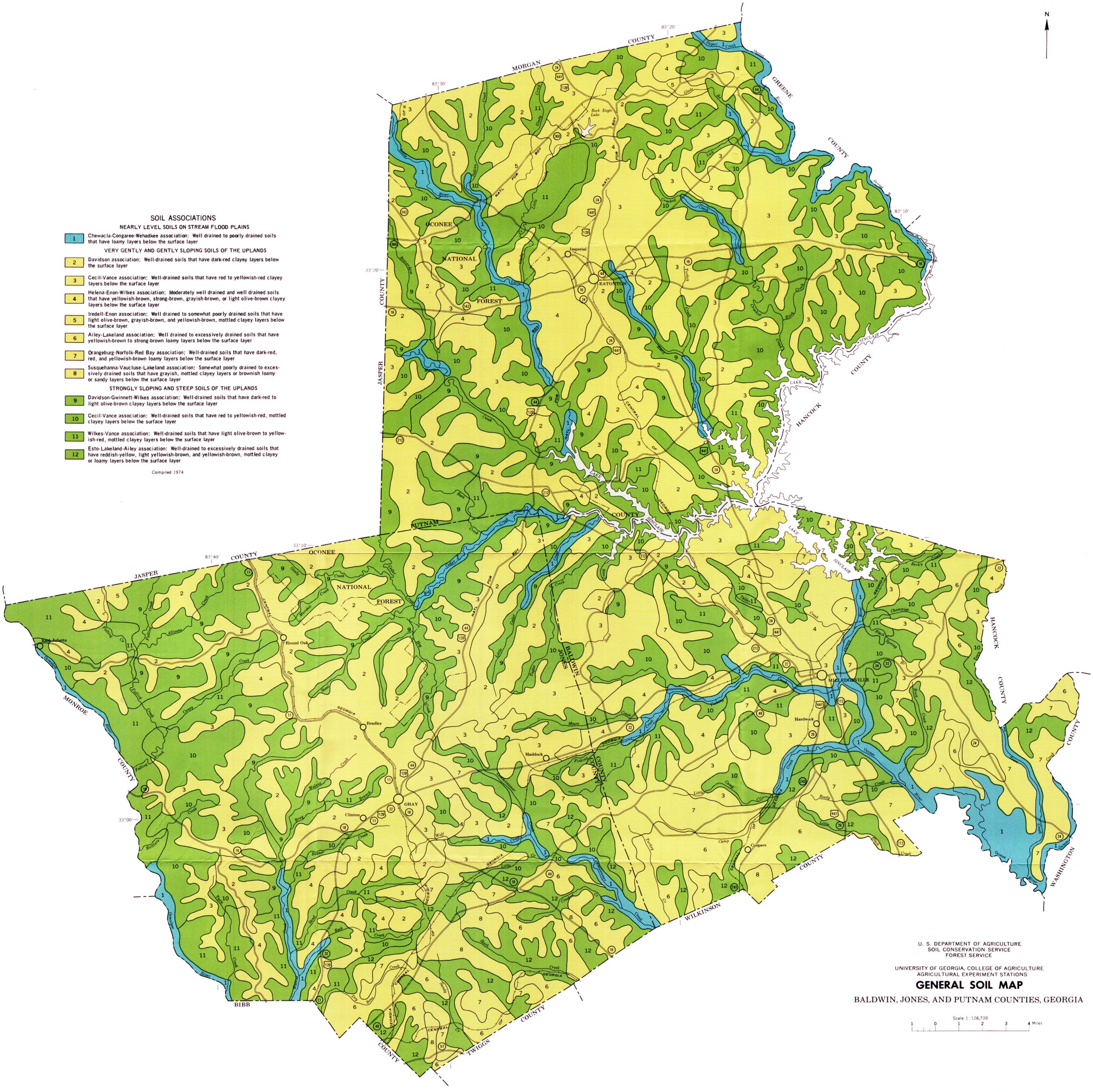


SOIL ASSOCIATIONS

NEARLY LEVEL SOILS ON STREAM FLOOD PLAINS

1 — Chewacla-Congaree-Wehadkee association: Well drained to poorly drained soils that have loamy layers below the surface layer

VERY GENTLY AND GENTLY SLOPING SOILS OF THE UPLANDS

2 — Davidson association: Well-drained soils that have dark-red clayey layers below the surface layer

3 — Cecil-Vance association: Well-drained soils that have red to yellowish-red clayey layers below the surface layer

4 — Helena-Enon-Wilkes association: Moderately well drained and well drained soils that have yellowish-brown, strong-brown, grayish-brown, or light olive-brown clayey layers below the surface layer

5 — Iredell-Enon association: Well drained to somewhat poorly drained soils that have light olive-brown, grayish-brown, and yellowish-brown, mottled clayey layers below the surface layer

6 — Ailey-Lakeland association: Well drained to excessively drained soils that have yellowish-brown to strong-brown loamy layers below the surface layer

7 — Orangeburg-Norfolk-Red Bay association: Well-drained soils that have dark-red, red, and yellowish-brown loamy layers below the surface layer

8 — Susquehanna-Vaucluse-Lakeland association: Somewhat poorly drained to excessively drained soils that have grayish, mottled clayey layers or brownish loamy or sandy layers below the surface layer

STRONGLY SLOPING AND STEEP SOILS OF THE UPLANDS

9 — Davidson-Gwinnett-Wilkes association: Well-drained soils that have dark-red to light olive-brown clayey layers below the surface layer

10 — Cecil-Vance association: Well-drained soils that have red to yellowish-red, mottled clayey layers below the surface layer

11 — Wilkes-Vance association: Well-drained soils that have light olive-brown to yellowish-red, mottled clayey layers below the surface layer

12 — Esto-Lakeland-Ailey association: Well-drained to excessively drained soils that have reddish-yellow, light yellowish-brown, and yellowish-brown, mottled clayey or loamy layers below the surface layer

Compiled 1974

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
FOREST SERVICE

UNIVERSITY OF GEORGIA, COLLEGE OF AGRICULTURE
AGRICULTURAL EXPERIMENT STATIONS

GENERAL SOIL MAP

BALDWIN, JONES, AND PUTNAM COUNTIES, GEORGIA

Scale 1:126,720

1 0 1 2 3 4 Miles

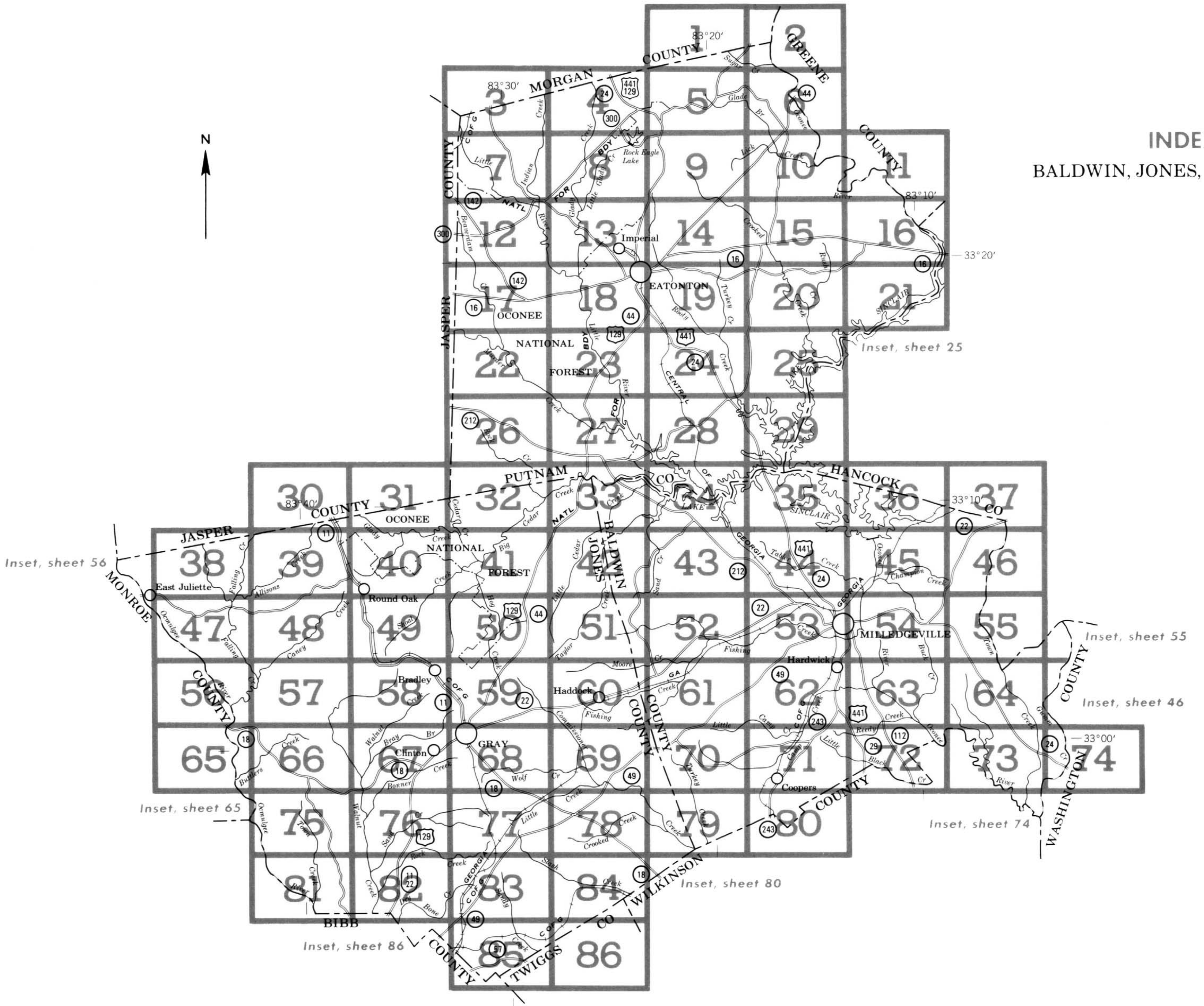
Each area outlined on this map consists of more than one kind of soil. The map is thus meant for general planning rather than a basis for decisions on the use of specific tracts.

INDEX TO MAP SHEETS

BALDWIN, JONES, AND PUTNAM COUNTIES, GEORGIA

Scale 1:316,800

1 0 1 2 3 4 5 Miles



SOIL LEGEND

The first letter in each symbol is the initial one of the soil name. If the third letter is a capital, it shows the range of slope, from A, less than 2 percent, to F, 15 to 35 percent slopes. Symbols without a slope letter are those of nearly level soils. Soils that are named as eroded have a final number, 2, in their symbol.

SYMBOL	NAME
AgB	Ailey loamy sand, 2 to 6 percent slopes
AgC	Ailey loamy sand, 6 to 10 percent slopes
AhD	Ailey soils, 10 to 15 percent slopes
AAC	Ailey and Norfolk loamy sands, 2 to 10 percent slopes
Bfs	Buncombe loamy sand
CAC	Cecil cobbly sandy loam, 2 to 10 percent slopes
CyB2	Cecil sandy loam, 2 to 6 percent slopes, eroded
CyC2	Cecil sandy loam, 6 to 10 percent slopes, eroded
CyE2	Cecil sandy loam, 10 to 25 percent slopes, eroded
CZB2	Cecil sandy clay loam, 2 to 6 percent slopes, eroded
CZC2	Cecil sandy clay loam, 6 to 10 percent slopes, eroded
CZE2	Cecil sandy clay loam, 10 to 25 percent slopes, eroded
Cst	Chewacla and Starr soils
Cot	Congaree and Toccoa soils
DgB2	Davidson loam, 2 to 6 percent slopes, eroded
DgC2	Davidson loam, 6 to 10 percent slopes, eroded
DhC2	Davidson clay loam, 6 to 10 percent slopes, eroded
DhE2	Davidson clay loam, 10 to 25 percent slopes, eroded
DyC	Davidson-Urban land complex, 2 to 10 percent slopes
EwD	Enon-Urban land complex, 5 to 12 percent slopes
EjB2	Enon soils, 2 to 6 percent slopes, eroded
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NhB	Norfolk loamy sand, 2 to 6 percent slopes
NhC	Norfolk loamy sand, 6 to 10 percent slopes
OeB	Orangeburg loamy sand, 2 to 6 percent slopes
OeC	Orangeburg loamy sand, 6 to 10 percent slopes
OeE	Orangeburg loamy sand, 10 to 20 percent slopes
PfE	Pacolet sandy loam, 10 to 25 percent slopes
RgB	Red Bay loamy sand, 2 to 6 percent slopes
RhC2	Red Bay sandy loam, 6 to 10 percent slopes, eroded
Sen	Starr and Toccoa soils
SiD	Susquehanna fine sandy loam, 5 to 15 percent slopes
VaB2	Vance sandy loam, 2 to 6 percent slopes, eroded
VaC2	Vance sandy loam, 6 to 10 percent slopes, eroded
VaE2	Vance sandy loam, 10 to 25 percent slopes, eroded
VbC2	Vance sandy clay loam, 2 to 10 percent slopes, eroded
VeC	Vaucluse loamy sand, 2 to 10 percent slopes
Whs	Wehadkee soils
WiC2	Wilkes sandy loam, 2 to 10 percent slopes, eroded
WiE	Wilkes soils, 10 to 25 percent slopes

CONVENTIONAL SIGNS

WORKS AND STRUCTURES

Highways and roads
- Divided
- Good motor
- Poor motor
- Trail

Highway markers
- National Interstate
- U. S.
- State or county

Railroads
- Single track
- Multiple track
- Abandoned

Bridges and crossings
- Road
- Trail
- Railroad
- Ferry — FY
- Ford — FORD
- Grade
- R. R. over
- R. R. under

Buildings
- School
- Church

Mine and quarry — QU.

Gravel pit

Power line

Pipeline

Cemetery

Dams

Levee

Tanks

Indian mound

Forest fire or lookout station

Windmill

Located object

BOUNDARIES

- National or state
- County
- Minor civil division
- Reservation
- Land grant
- Small park, cemetery, airport
- Land survey division corners

DRAINAGE

Streams, double-line
- Perennial
- Intermittent

Streams, single-line
- Perennial
- Intermittent
  - Crossable with tillage implements
  - Not crossable with tillage implements
  - Unclassified

Canals and ditches

Lakes and ponds
- Perennial — water, w
- Intermittent — int

Spring

Marsh or swamp

Wet spot

Drainage end or alluvial fan

RELIEF

Escarpments
- Bedrock
- Other

Short steep slope

Prominent peak

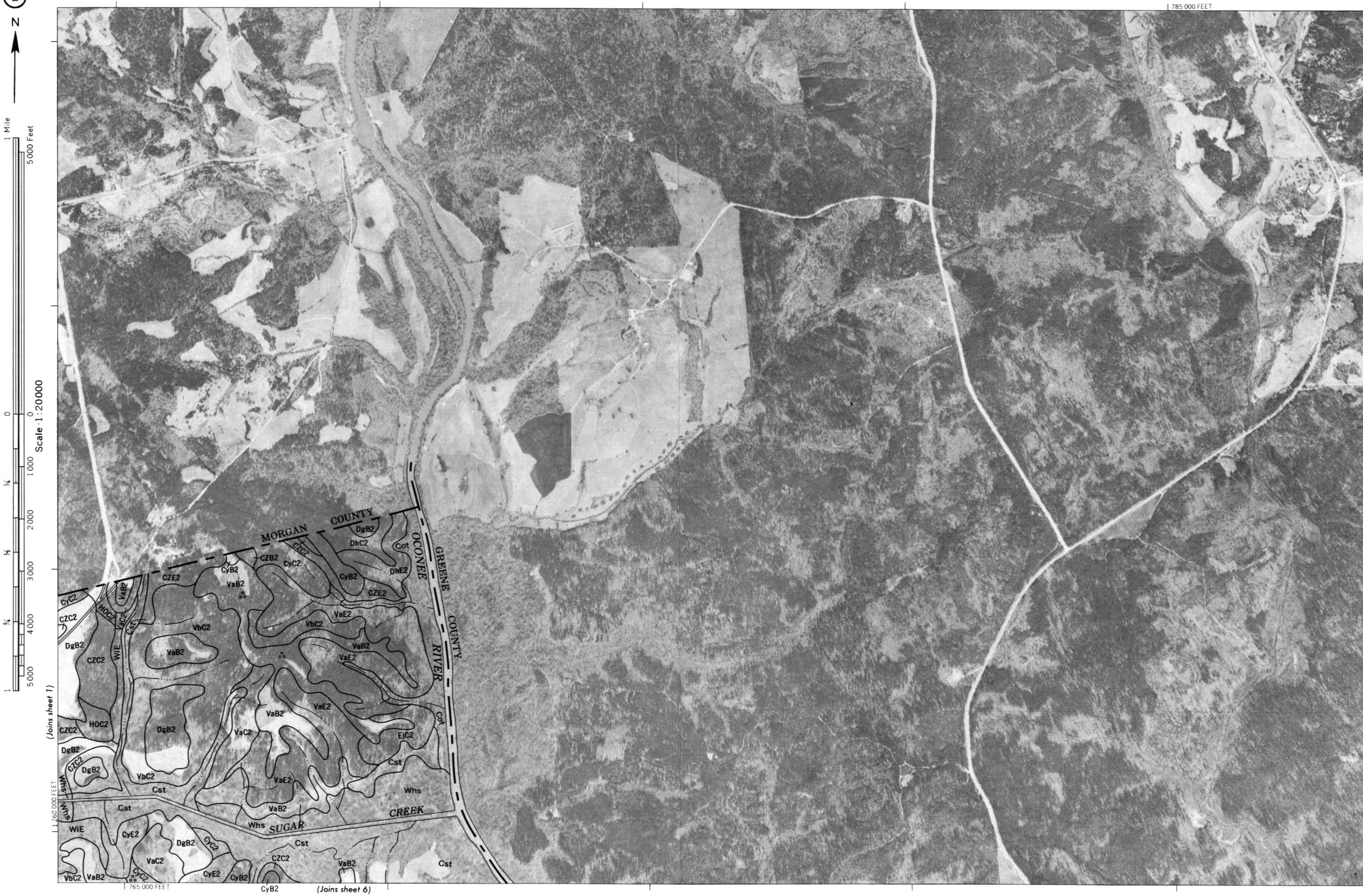
Depressions (Large, Small)
- Crossable with tillage implements
- Not crossable with tillage implements
- Contains water most of the time

SOIL SURVEY DATA

- Soil boundary and symbol — Dx
- Gravel
- Stoniness: Stony; Very stony
- Rock outcrops
- Chert fragments
- Clay spot
- Sand spot
- Gumbo or scabby spot
- Made land
- Severely eroded spot
- Blowout, wind erosion
- Gully
- Borrow pit — B.P.

This map is compiled on 1972 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

BALDWIN, JONES, AND PUTNAM COUNTIES, GEORGIA — SHEET NUMBER 2



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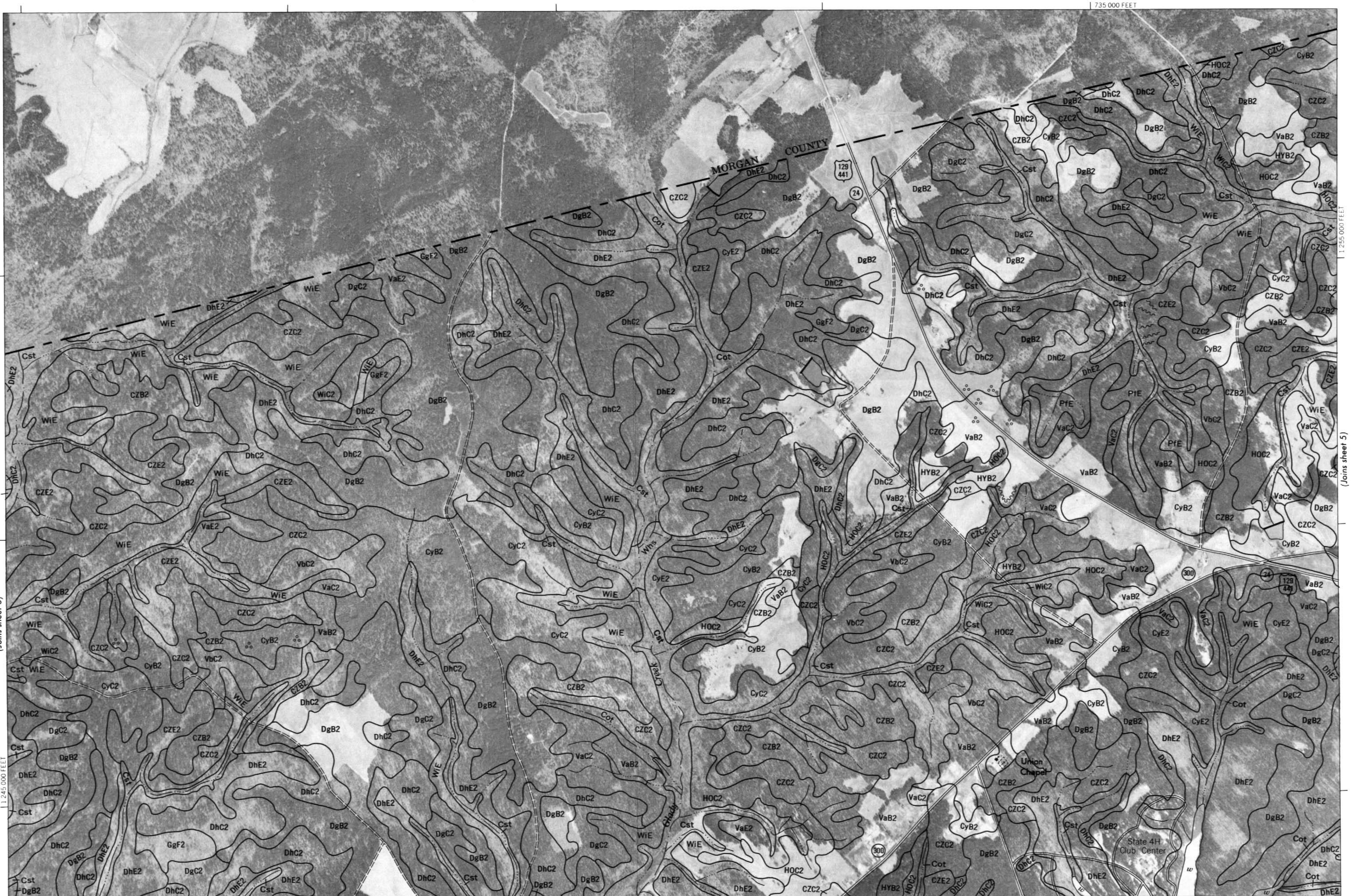

N

1 Mile

5000 Feet

Scale 1:20000

0 ¼ ½ ¾ 1

0 1000 2000 3000 4000 5000

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BALDWIN, JONES, AND PUTNAM COUNTIES, GEORGIA — SHEET NUMBER 6

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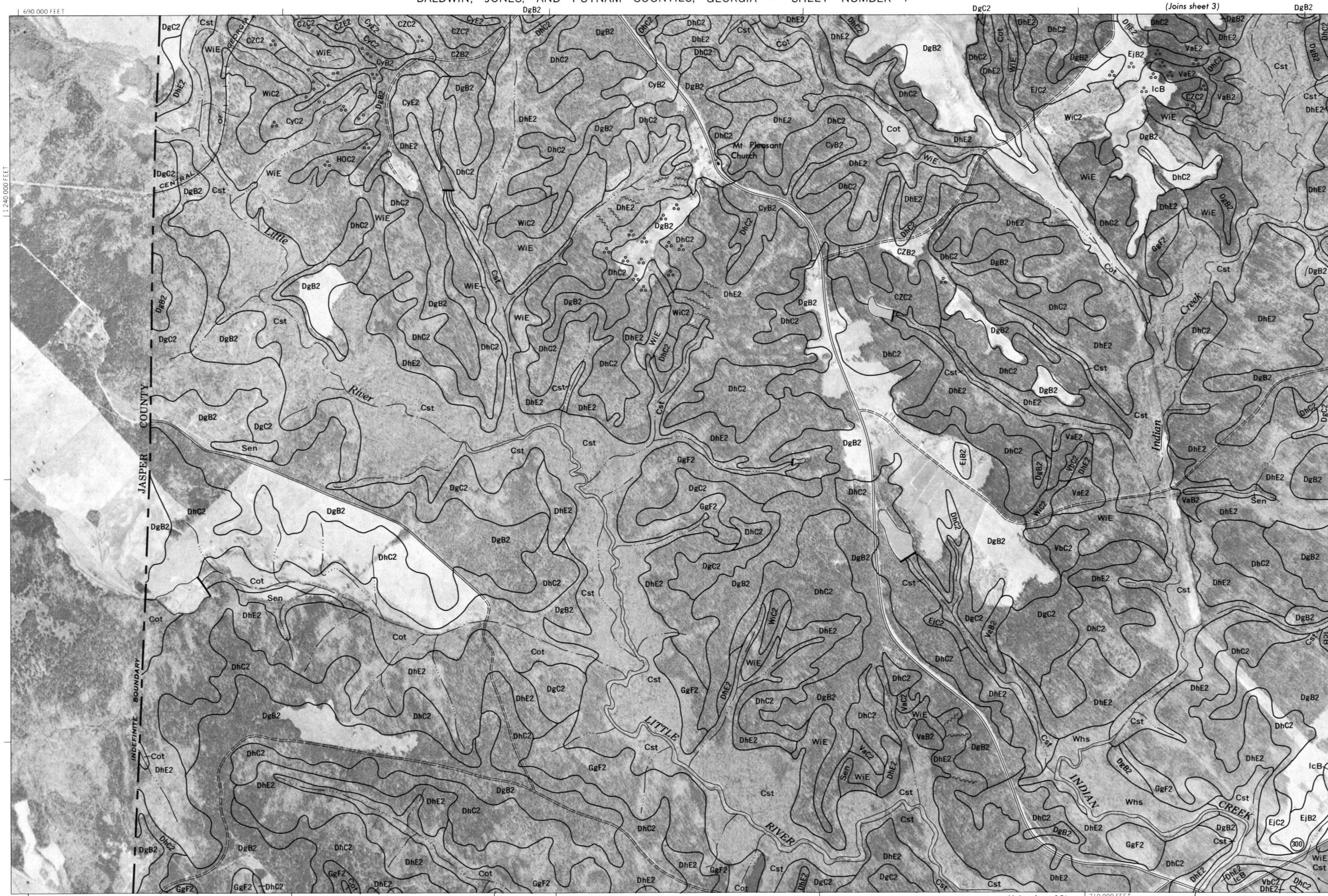

7

N

Scale 1:20000

1 Mile

5000 Feet

0 1000 2000 3000 4000 5000

0 ¼ ½ ¾ 1

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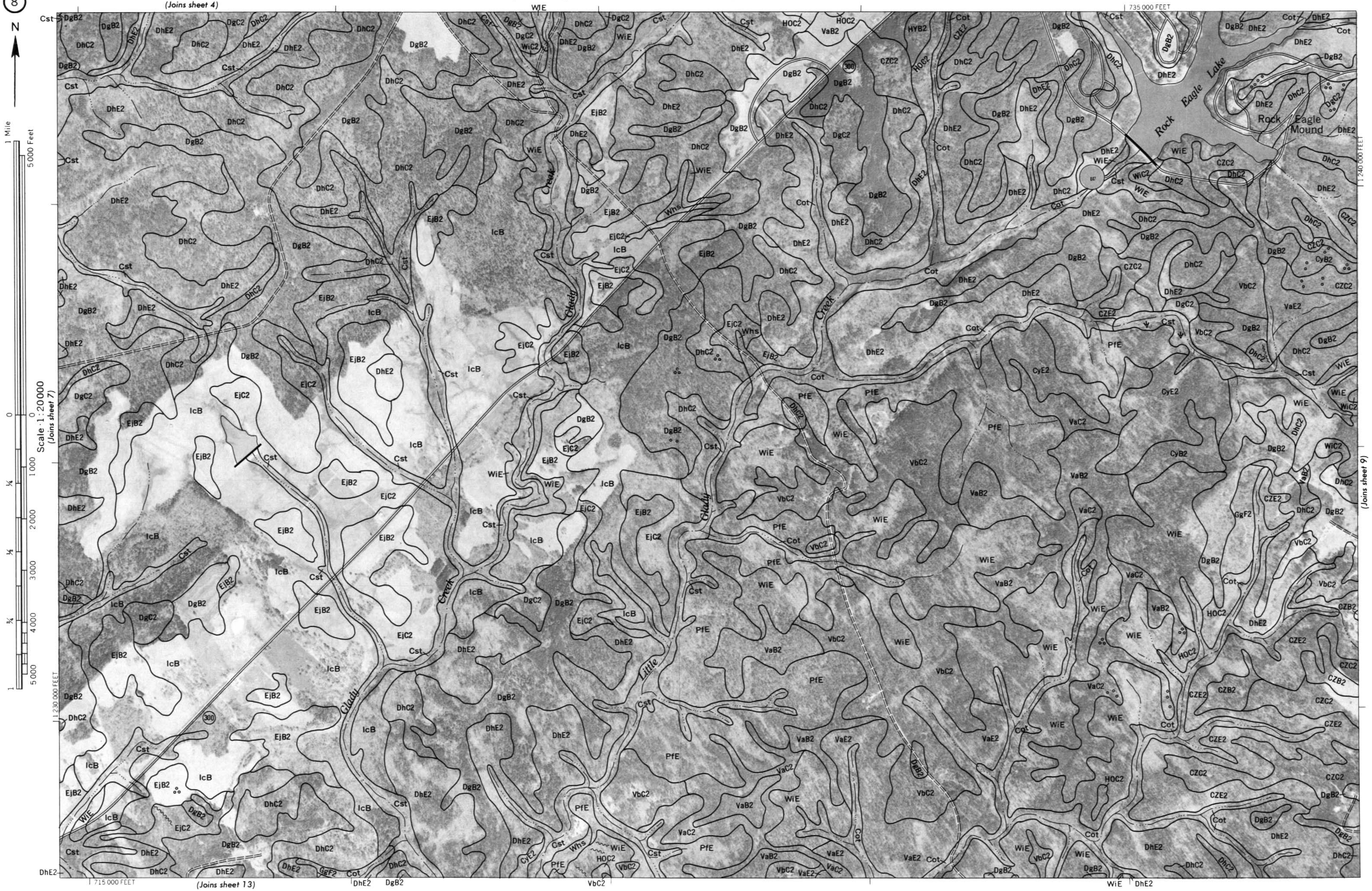
Coordinate grid ticks and land division corners, if shown, are approximately positioned



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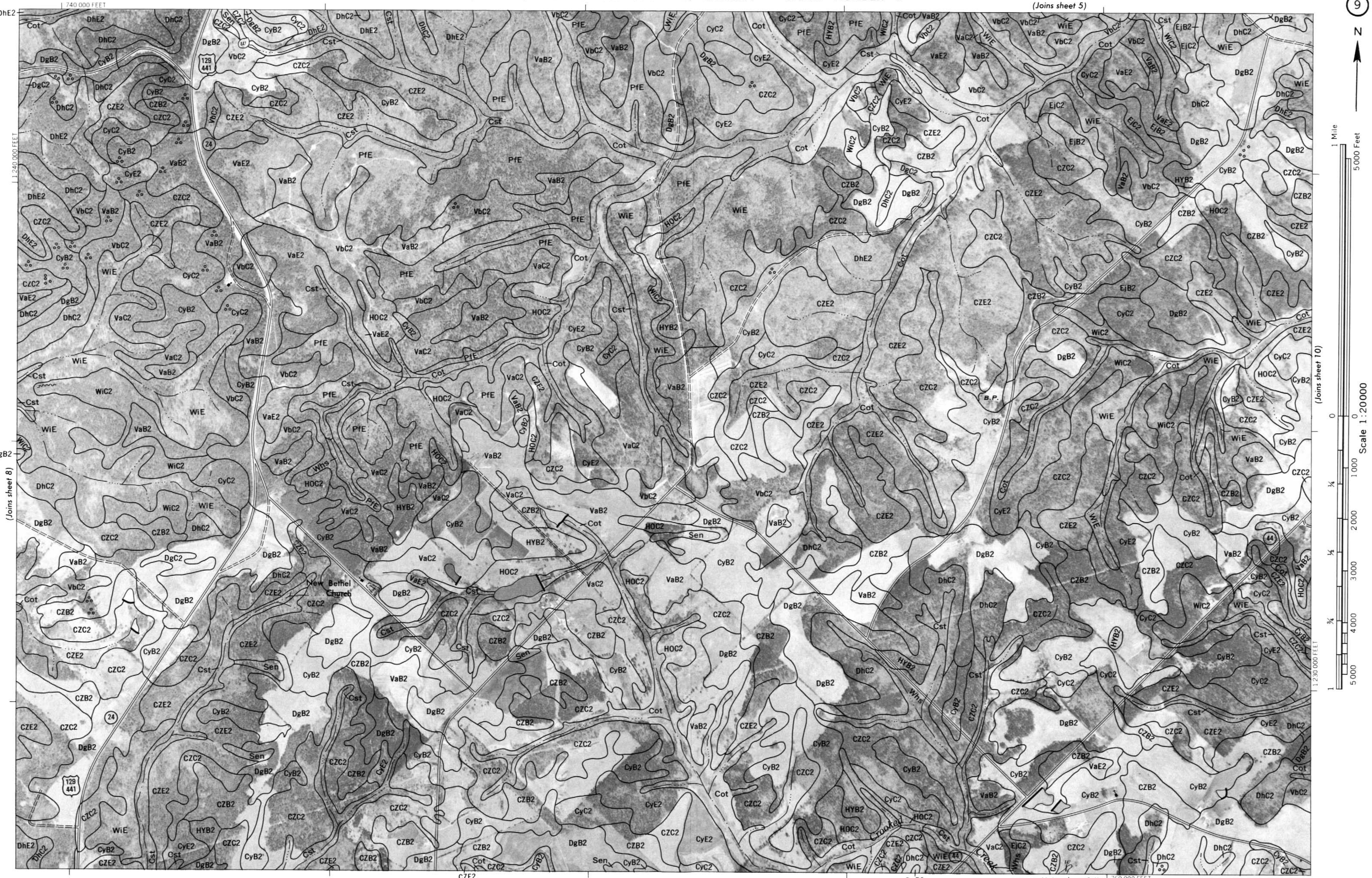

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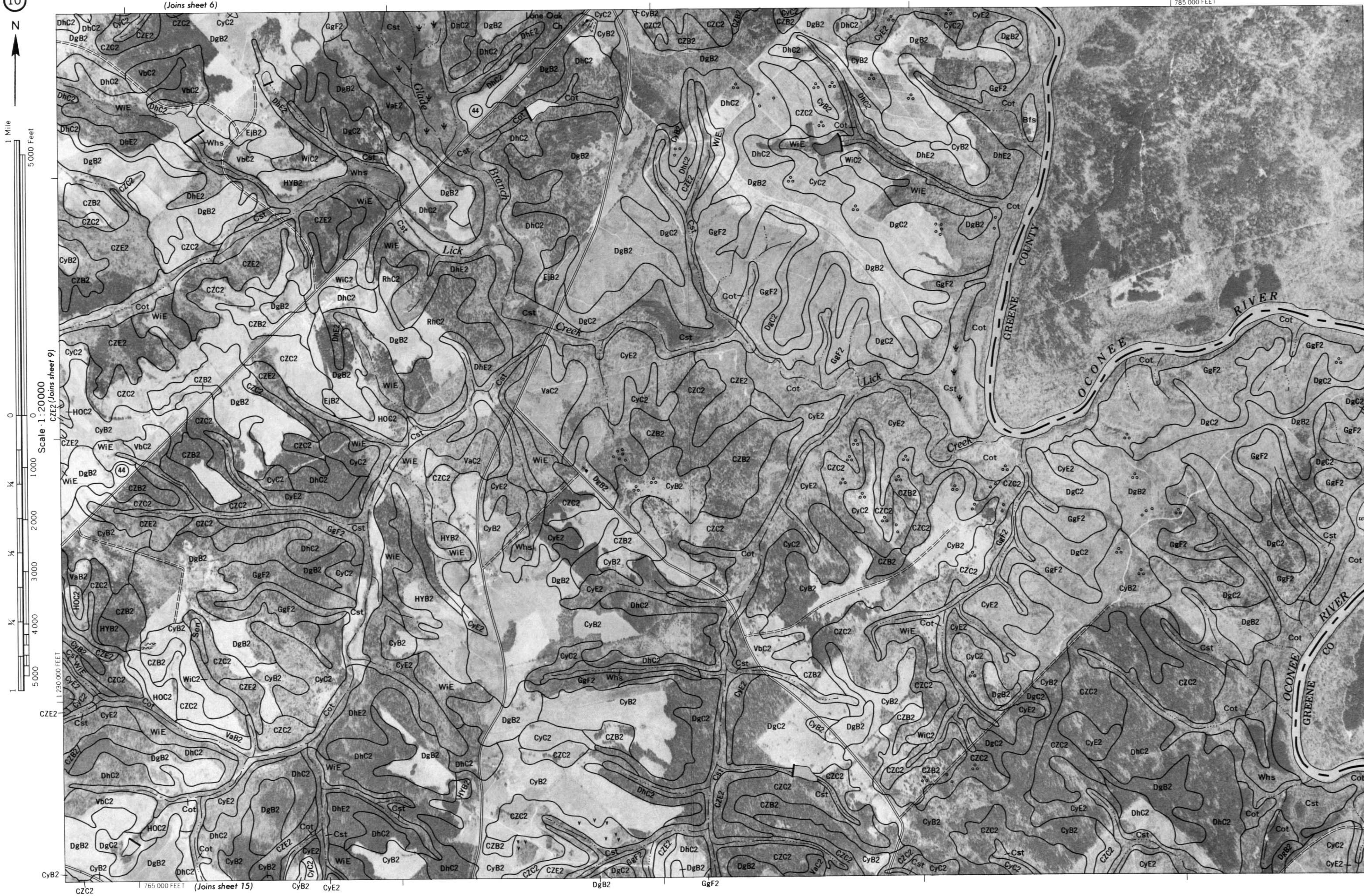

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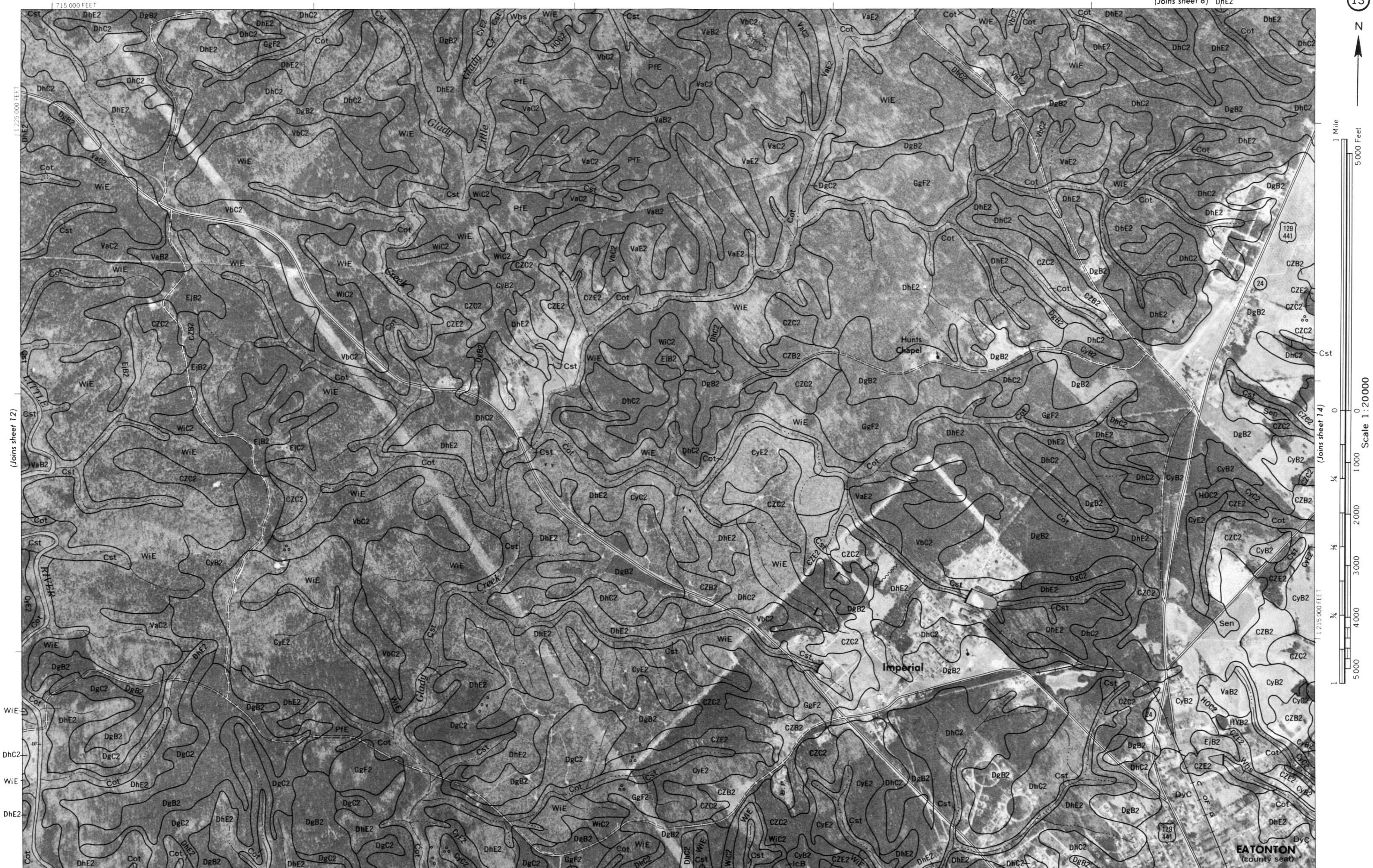
N

Scale 1:20000

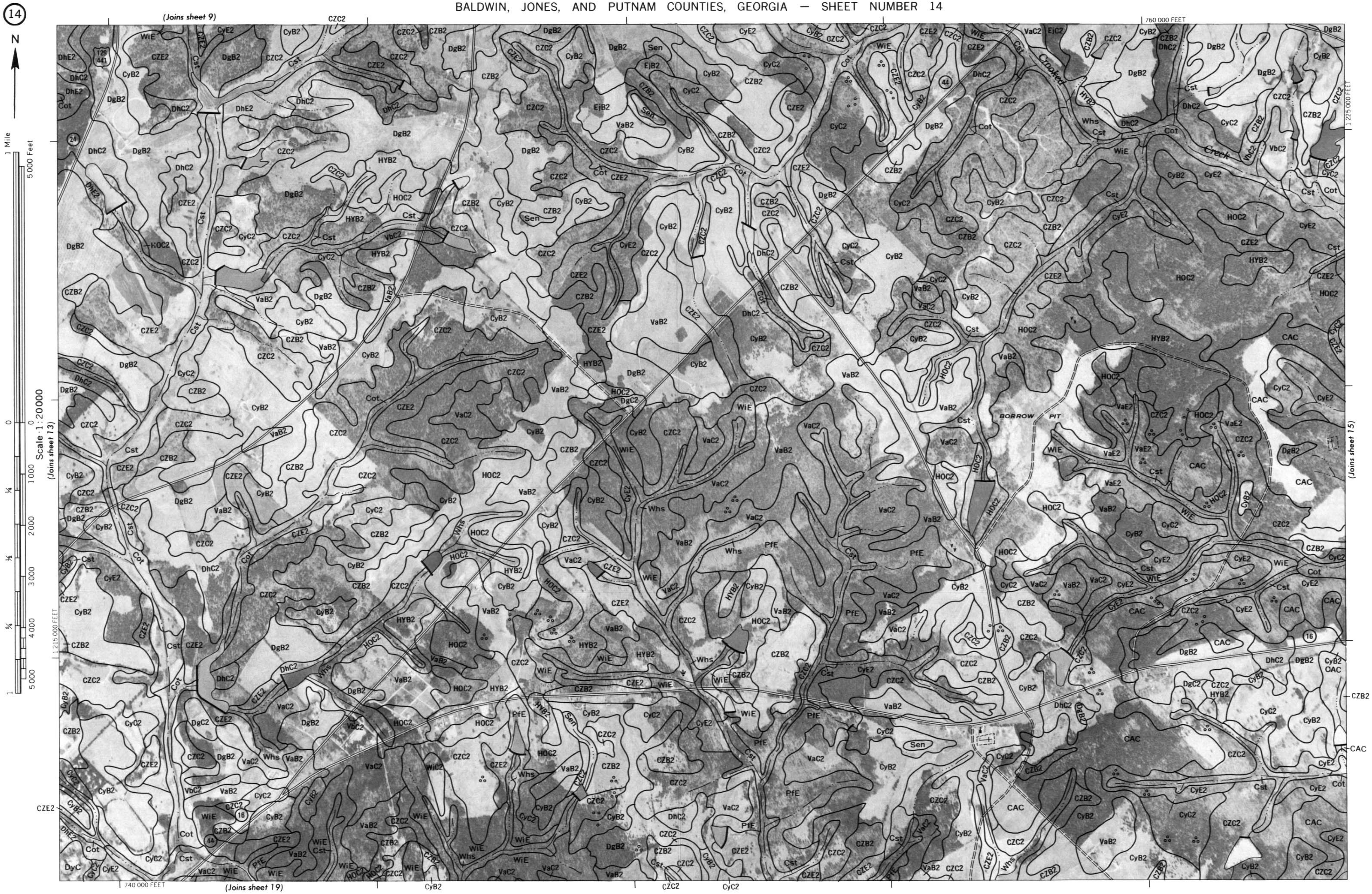
1 Mile
0 ¼ ½ ¾ 1

5000 Feet
0 1000 2000 3000 4000 5000

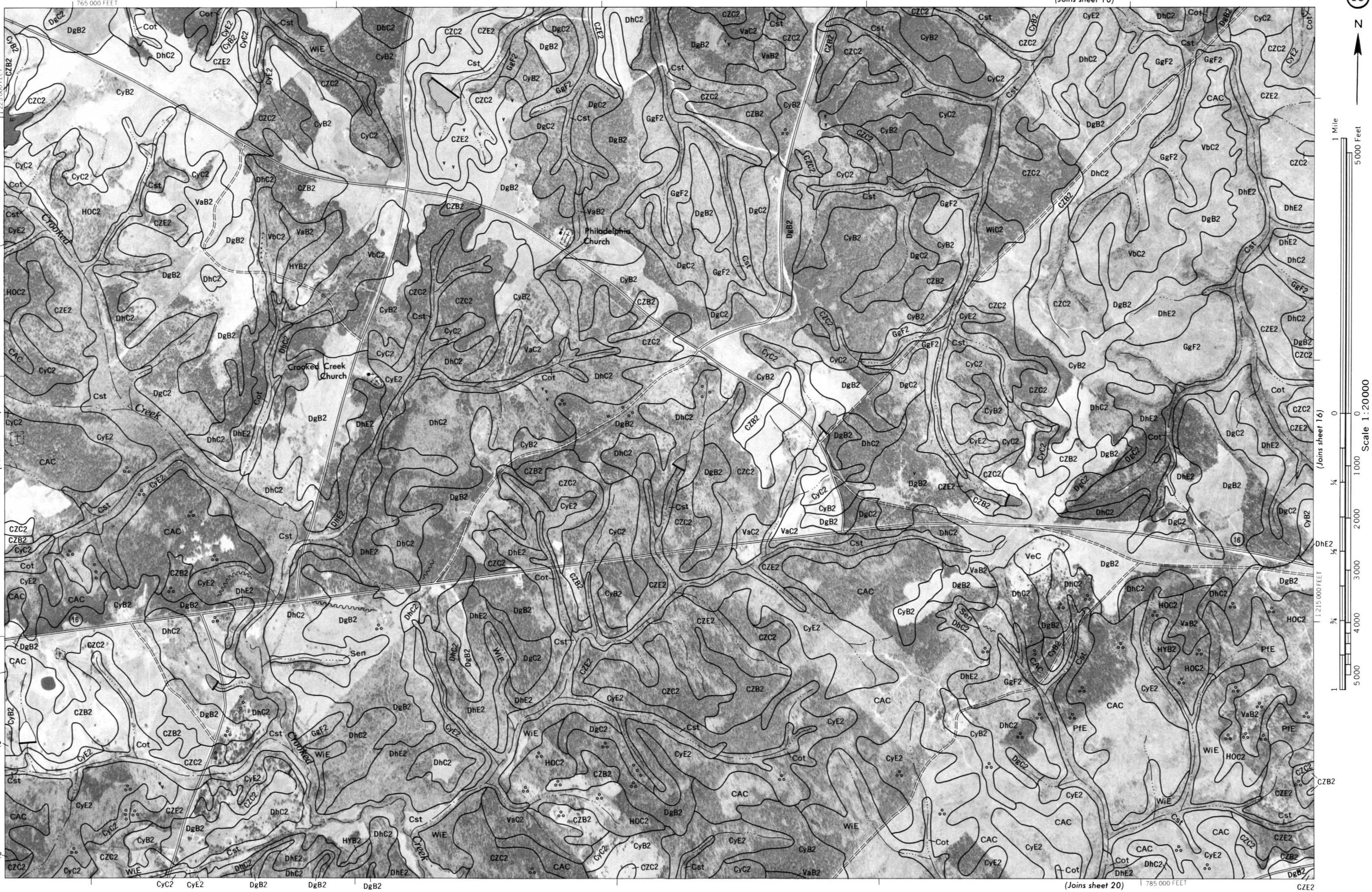
This map is compiled on 1972 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.



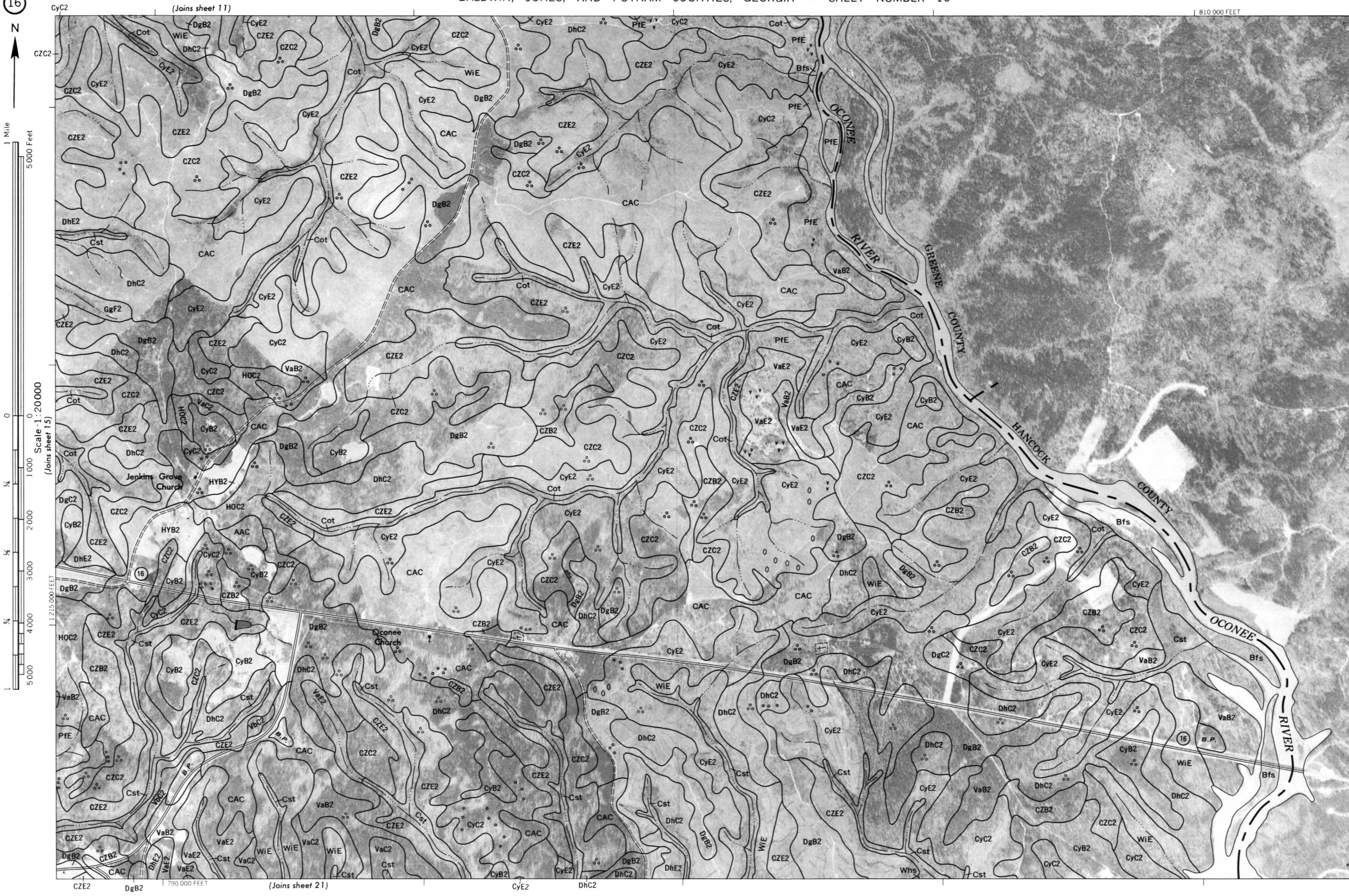
This map is compiled on 1972 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.



This map is compiled on 1972 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.



This map is compiled on 1972 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

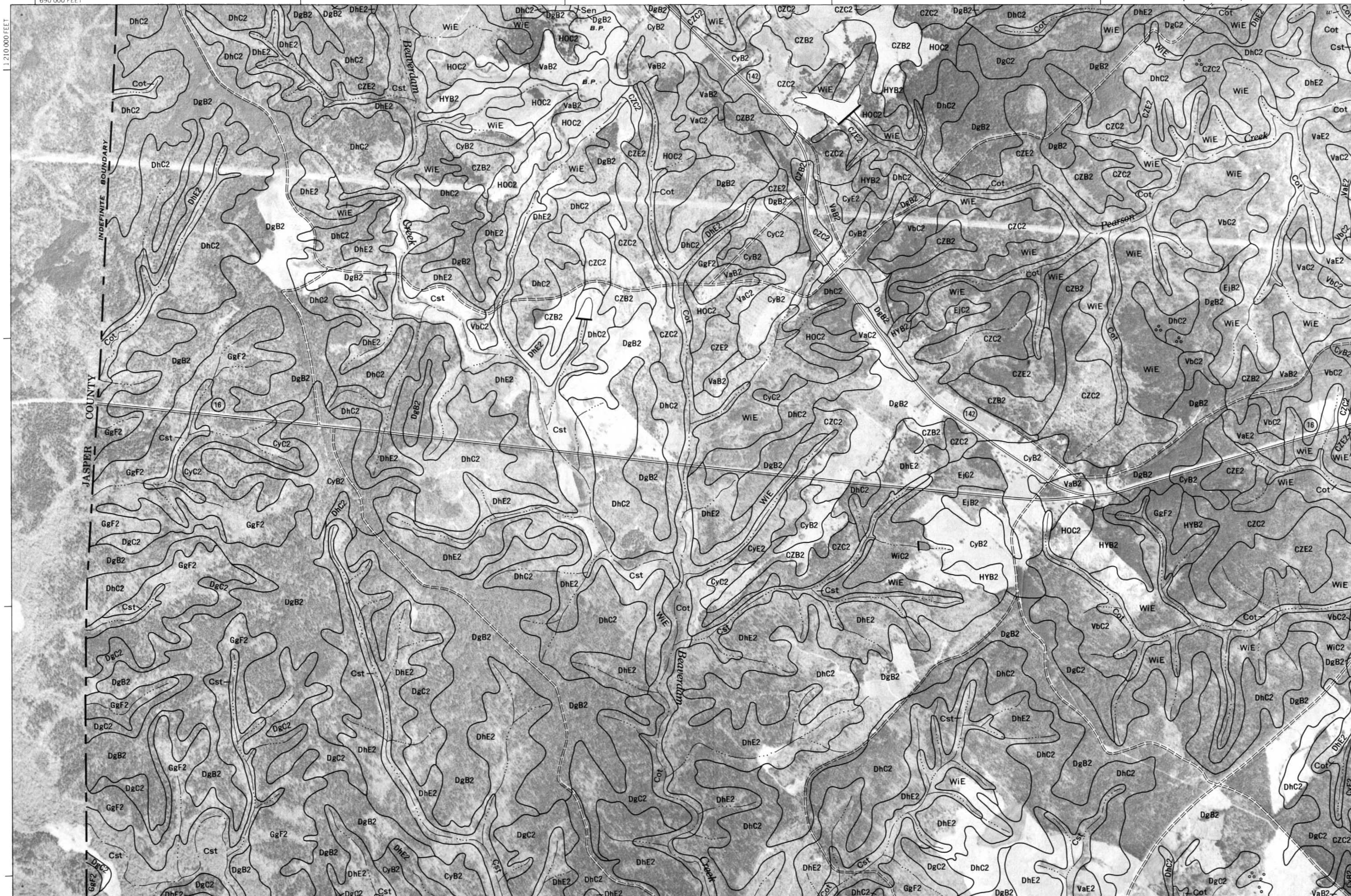


This map is compiled on 1972 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

(Joins sheet 12)

690 000 FEET

1 210 000 FEET



(Joins sheet 18)

(Joins sheet 22)

710 000 FEET

1 195 000 FEET

N

1 Mile

5000 Feet

0 ¼ ½ ¾ 1

0 1000 2000 3000 4000 5000

Scale 1:20000

This map is compiled on 1972 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

(Joins sheet 13)

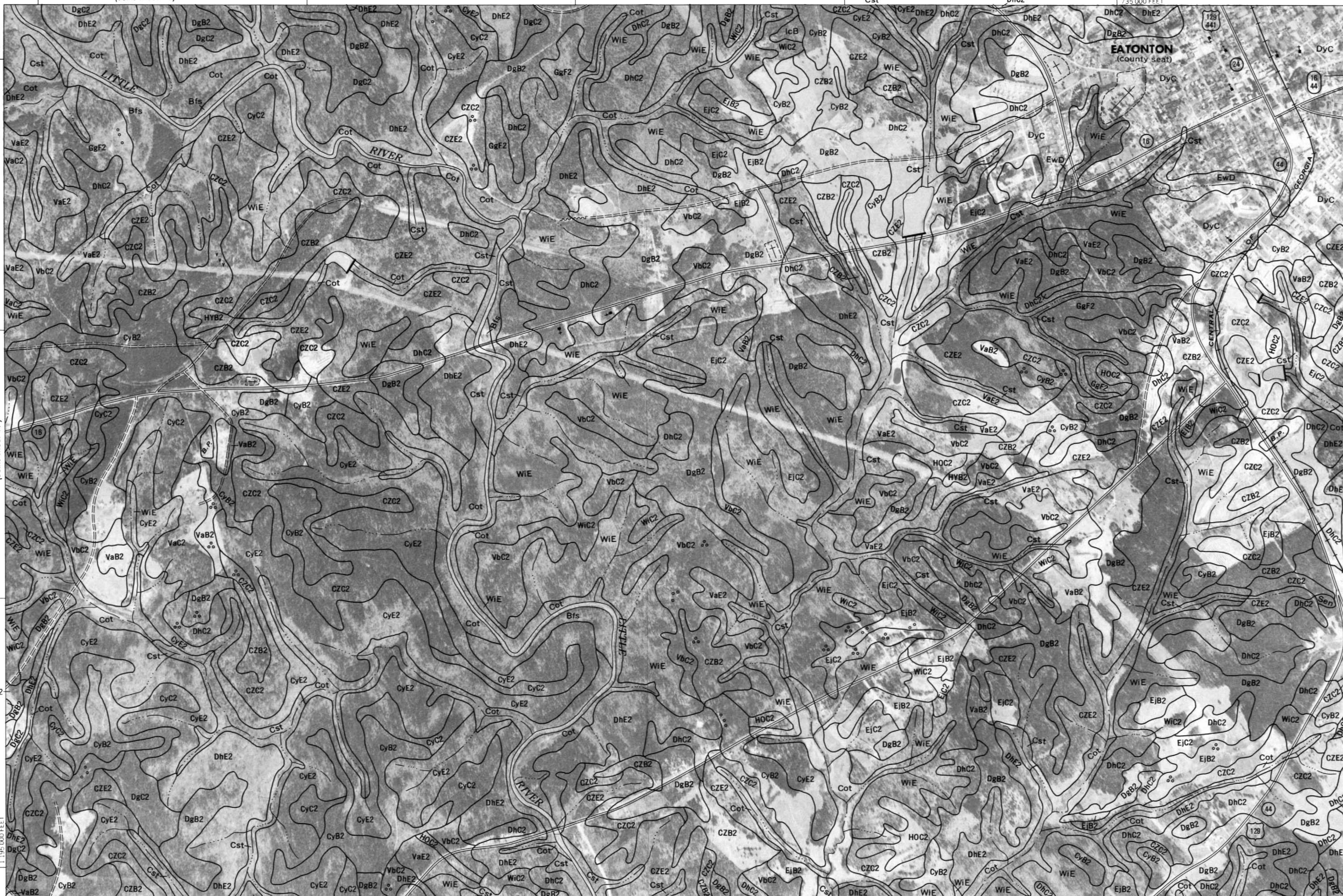
N

1 Mile

5000 Feet

Scale 1:20000

(Joins sheet 17)



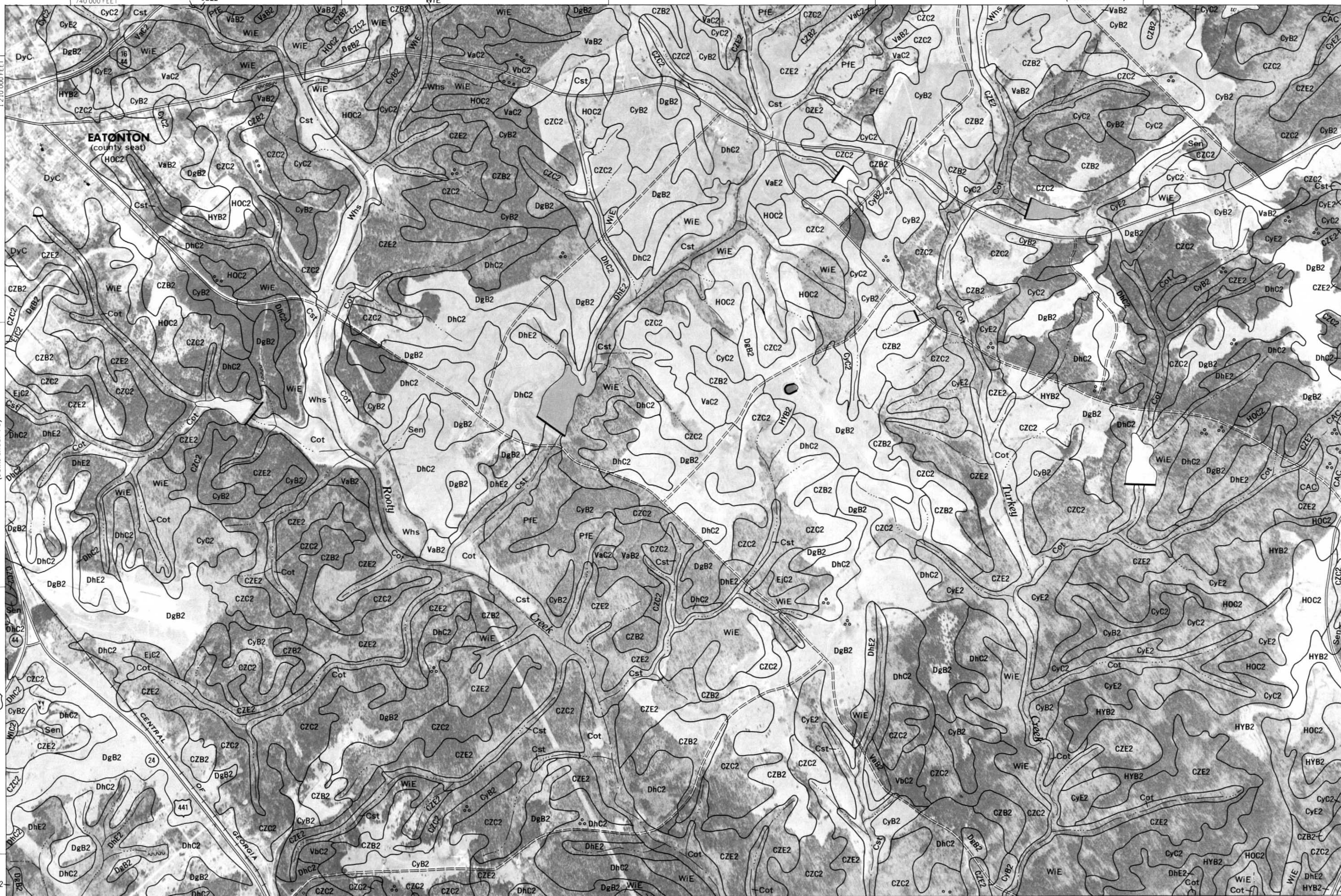
(Joins sheet 19)

(Joins sheet 23)

This map is compiled on 1972 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

19

(Joins sheet 14)



(Joins sheet 24)

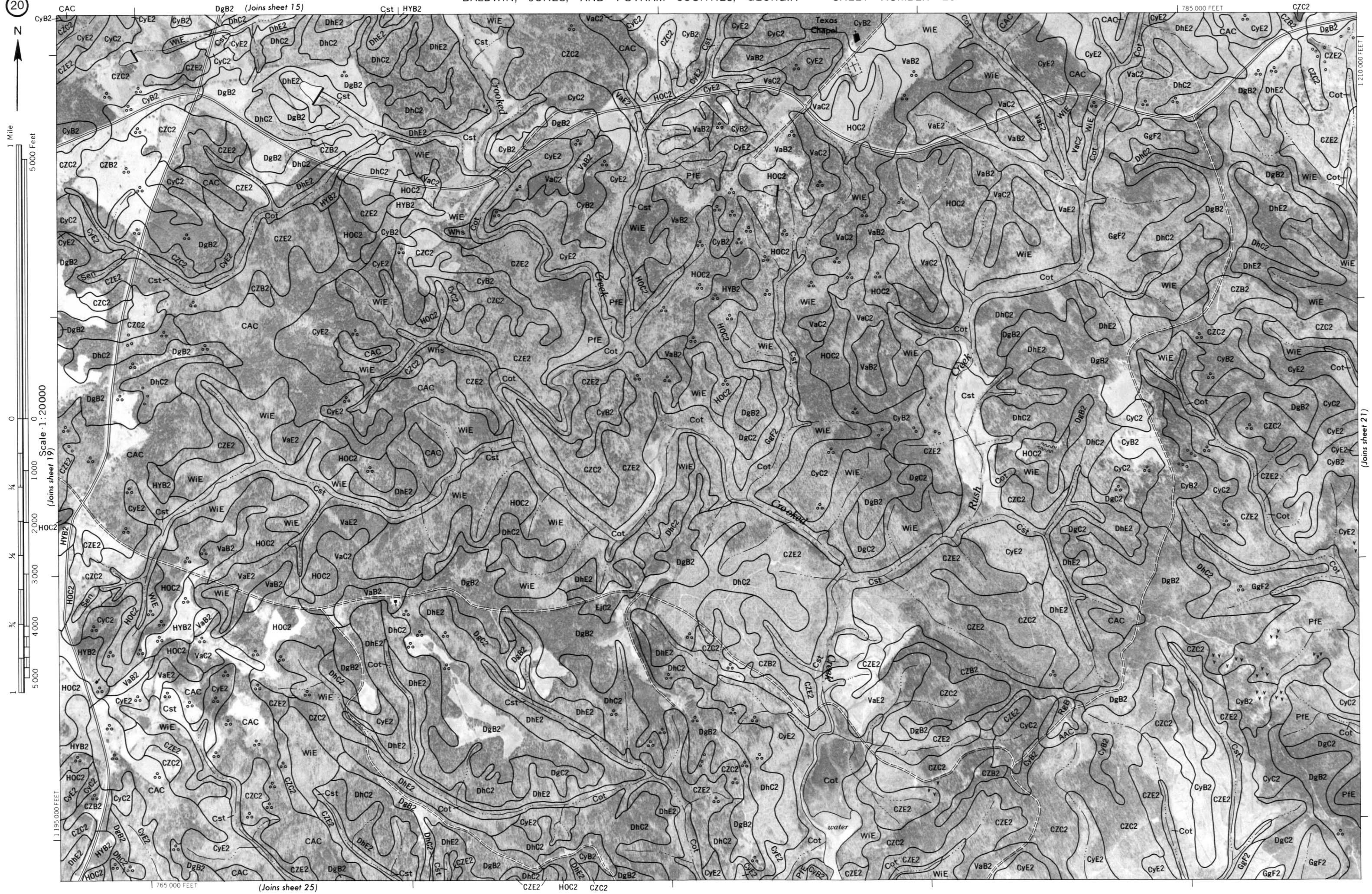
N

Scale 1:20000

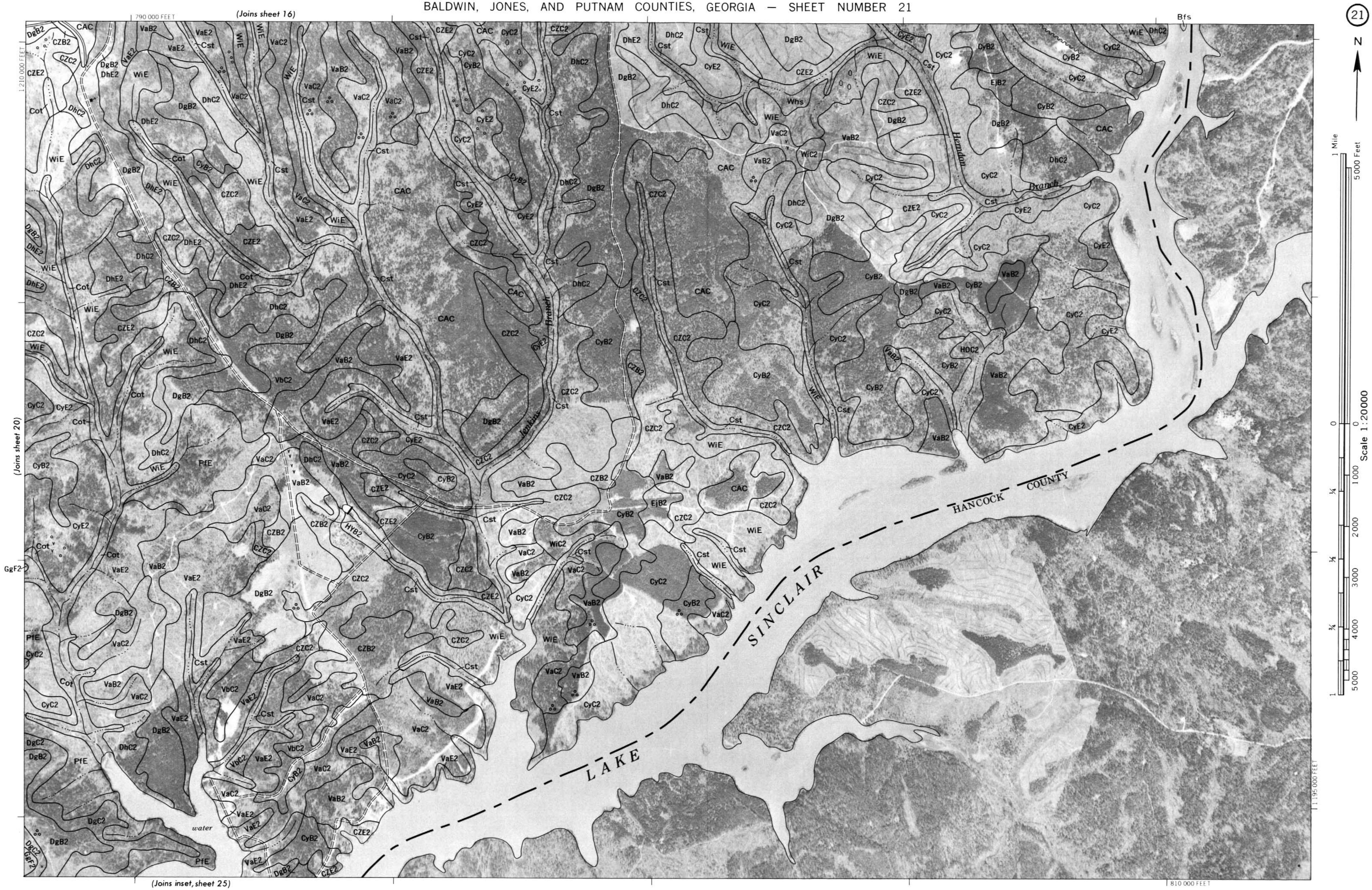
1 Mile · 0 · ¼ · ½ · ¾ · 1

5000 Feet · 0 · 1000 · 2000 · 3000 · 4000 · 5000

This map is compiled on 1972 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.



This map is compiled on 1972 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.



This map is compiled on 1972 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies
Coordinate grid ticks and land division corners, if shown, are approximately positioned

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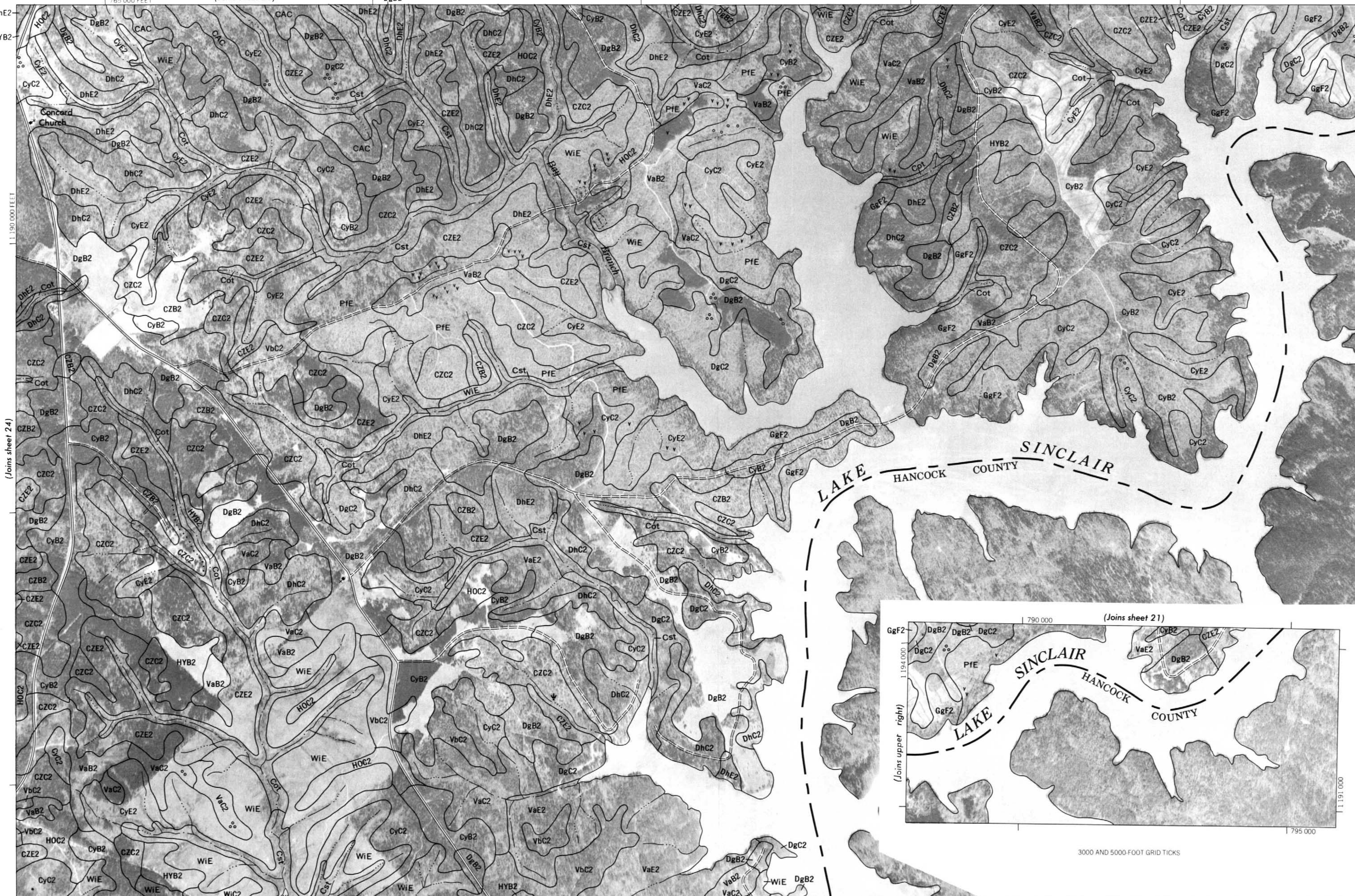

N

1 Mile

5000 Feet

Scale 1:20000

This map is compiled on 1972 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

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Coordinate grid ticks and land division corners, if shown, are approximately positioned.

This map is compiled on 1972 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

(Joins sheet 24)

(Joins sheet 27)

(Joins sheet 29)

(Joins sheet 34)

N

1 Mile

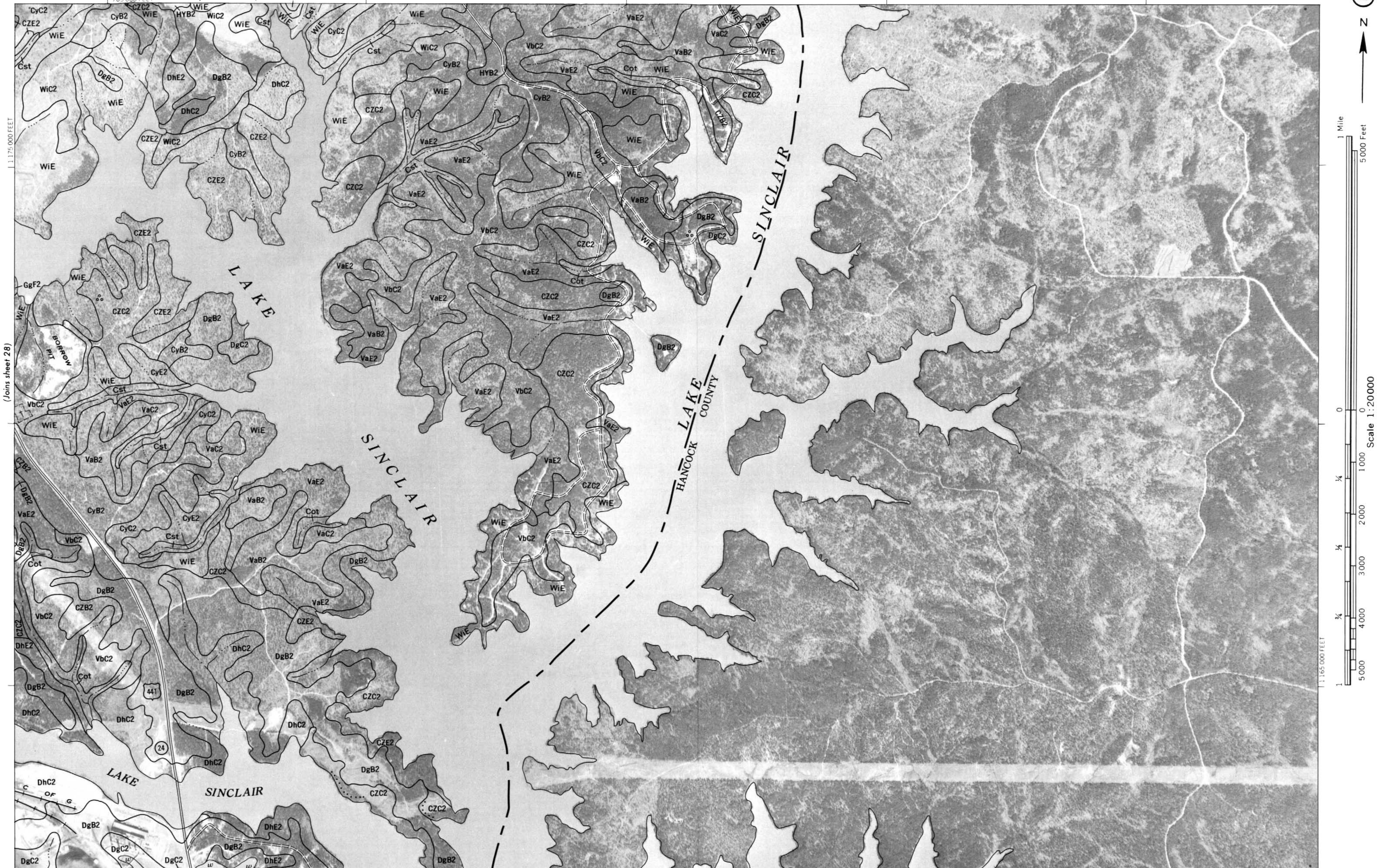
5000 Feet

Scale 1:20 000

0 1000 2000 3000 4000 5000

0 ¼ ½ ¾ 1

This map is compiled on 1972 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.



This map is compiled on 1972 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

This map is compiled on 1972 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

665 000 FEET

1 160 000 FEET

This map is compiled on 1972 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

(Joins sheet 30)

1 150 000 FEET

685 000 FEET

(Joins sheet 32)

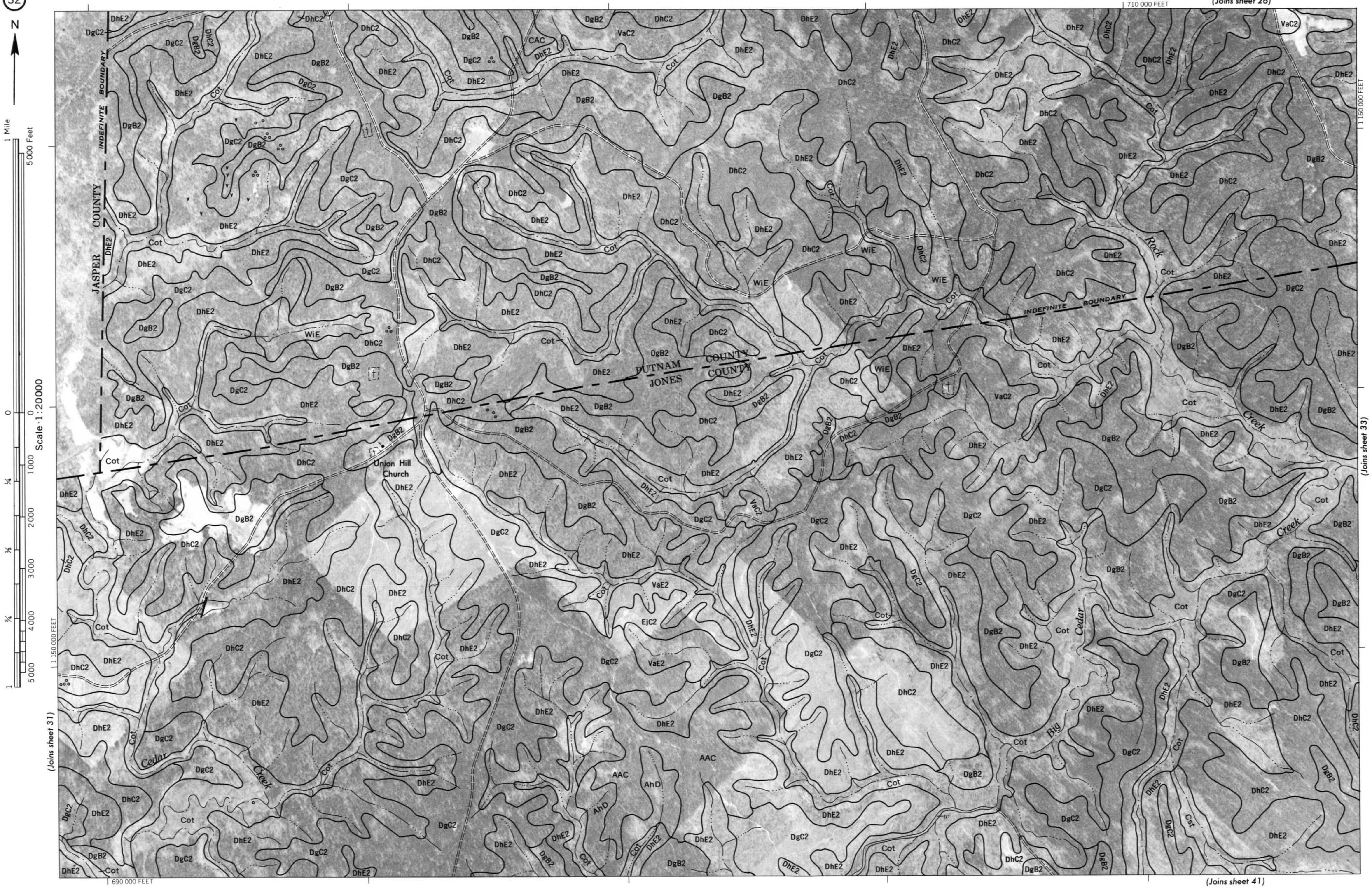
(Joins sheet 40)

N

Scale 1:20000

1 Mile
0 ¼ ½ ¾ 1

5000 Feet
0 1000 2000 3000 4000 5000

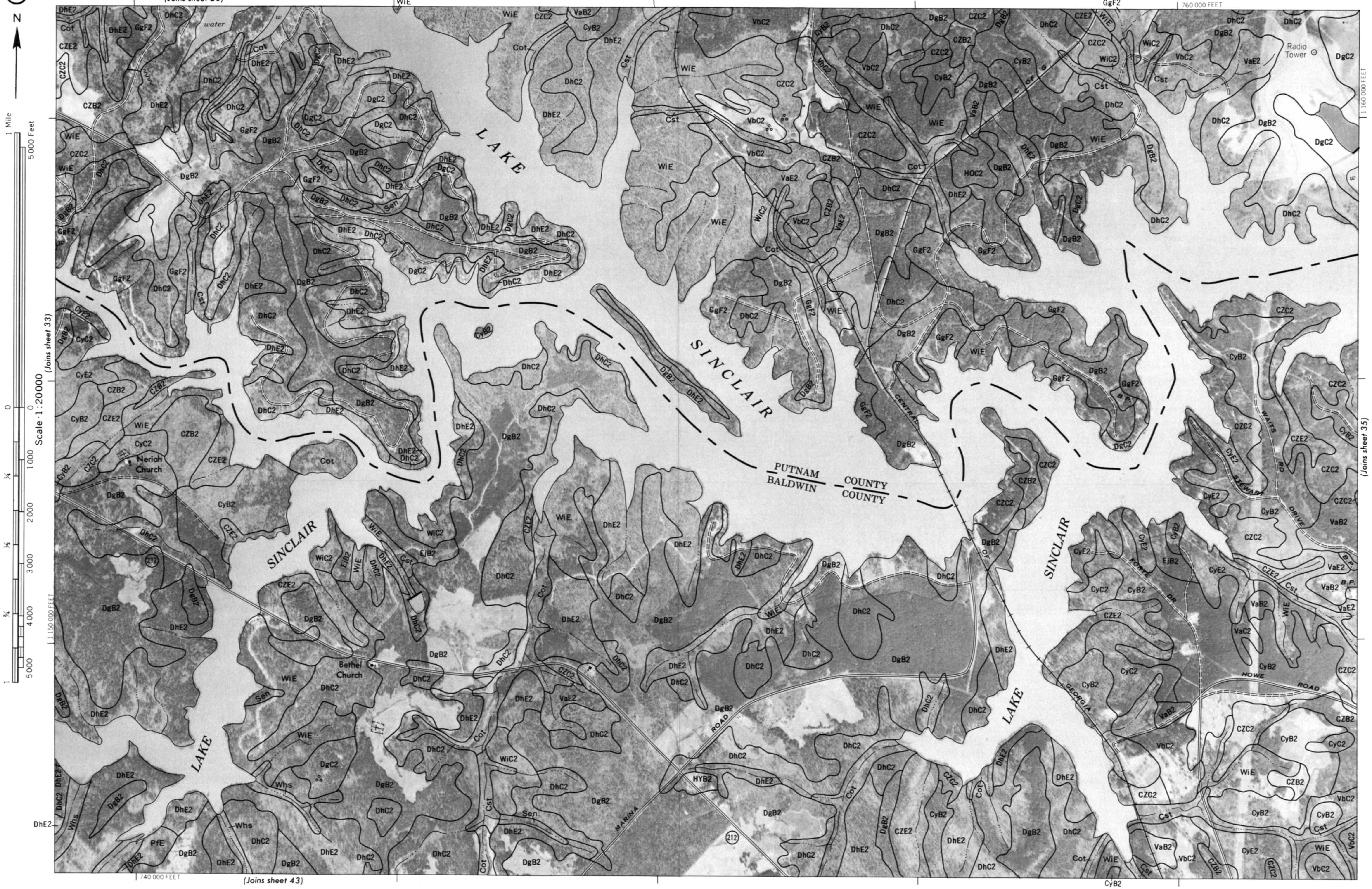


This map is compiled on 1972 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

N

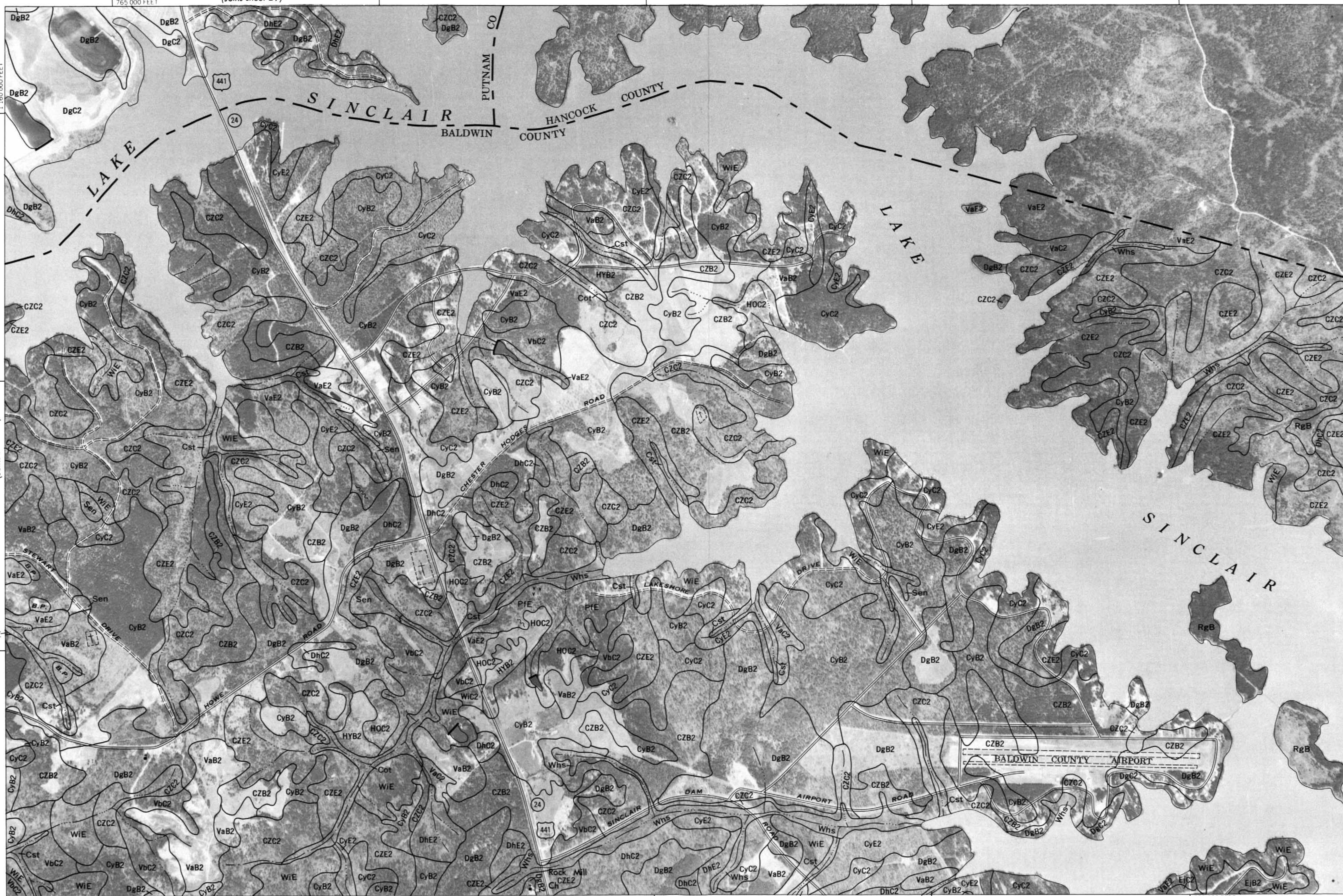
1 Mile
5 000 Feet
0
0
1000
¼
2000
½
3000
¾
4000
1
5000
Scale 1:20 000

This map is compiled on 1972 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.



This map is compiled on 1972 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

(Joins sheet 29)



(Joins sheet 34)

(Joins sheet 36)

(Joins sheet 44)

N

1 Mile

5000 Feet

Scale 1:20000

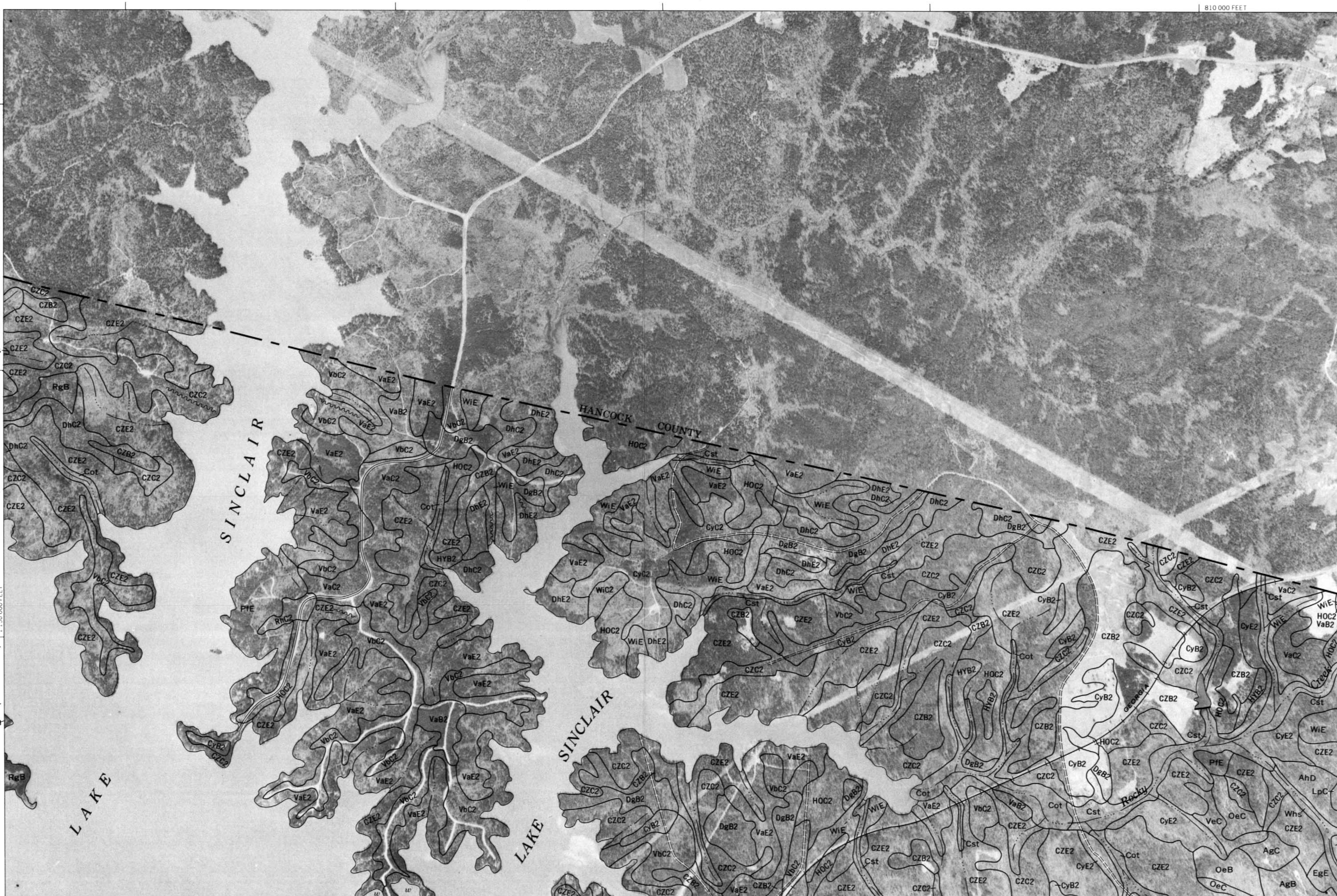
0 ¼ ½ ¾ 1

0 1000 2000 3000 4000 5000

This map is compiled on 1972 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

N

1 Mile | 5000 Feet | Scale 1:20000 | 0 | 1000 | 2000 | 3000 | 4000 | 5000 | 0 | ¼ | ½ | ¾ | 1



(Joins sheet 35)

(Joins sheet 37)

(Joins sheet 45)

This map is compiled on 1972 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

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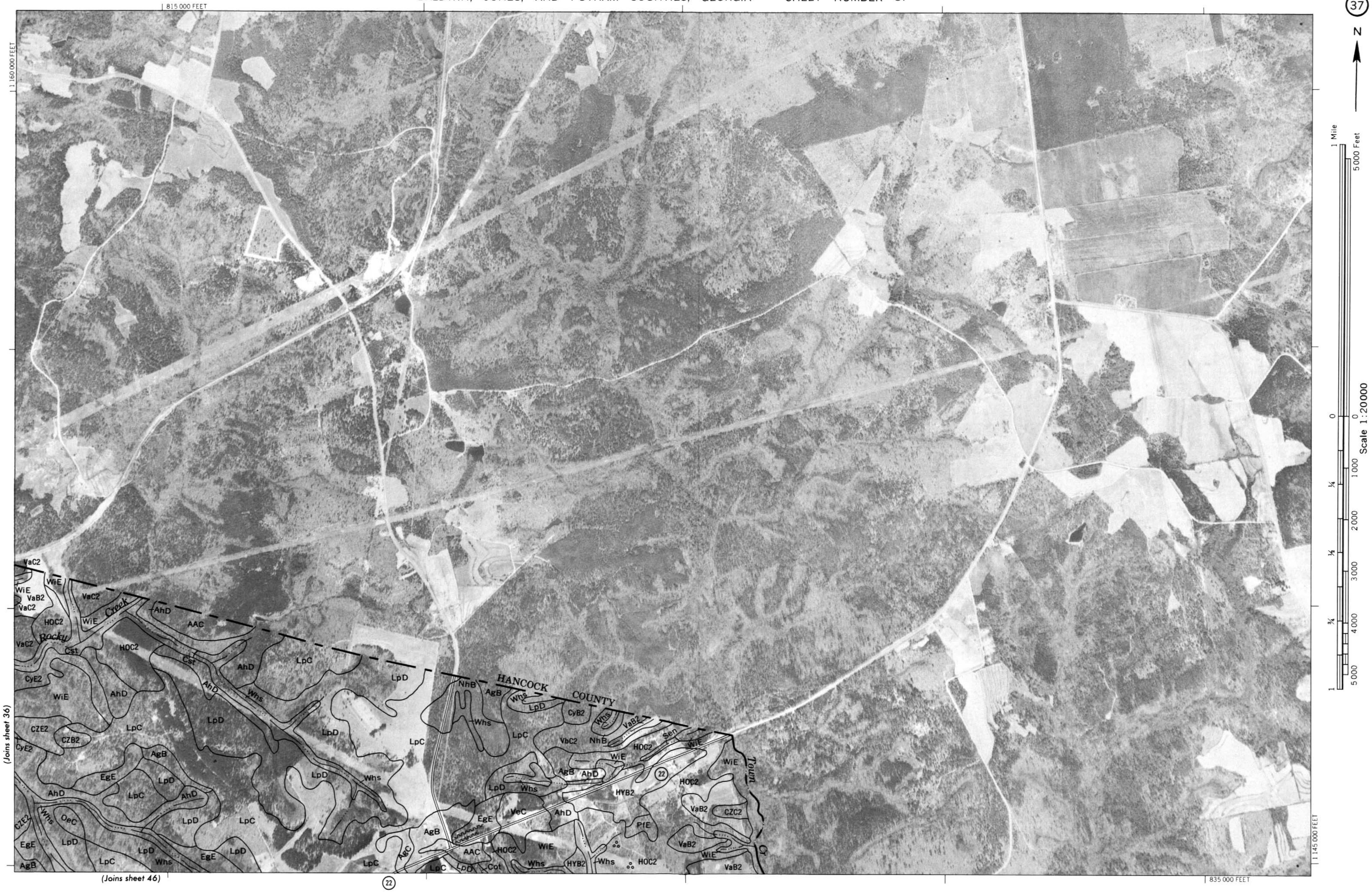
Coordinate grid ticks and land division corners, if shown, are approximately positioned.



BALDWIN, JONES, AND PUTNAM COUNTIES, GEORGIA — SHEET NUMBER 38

N

1 Mile | 5000 Feet

Scale 1:20000

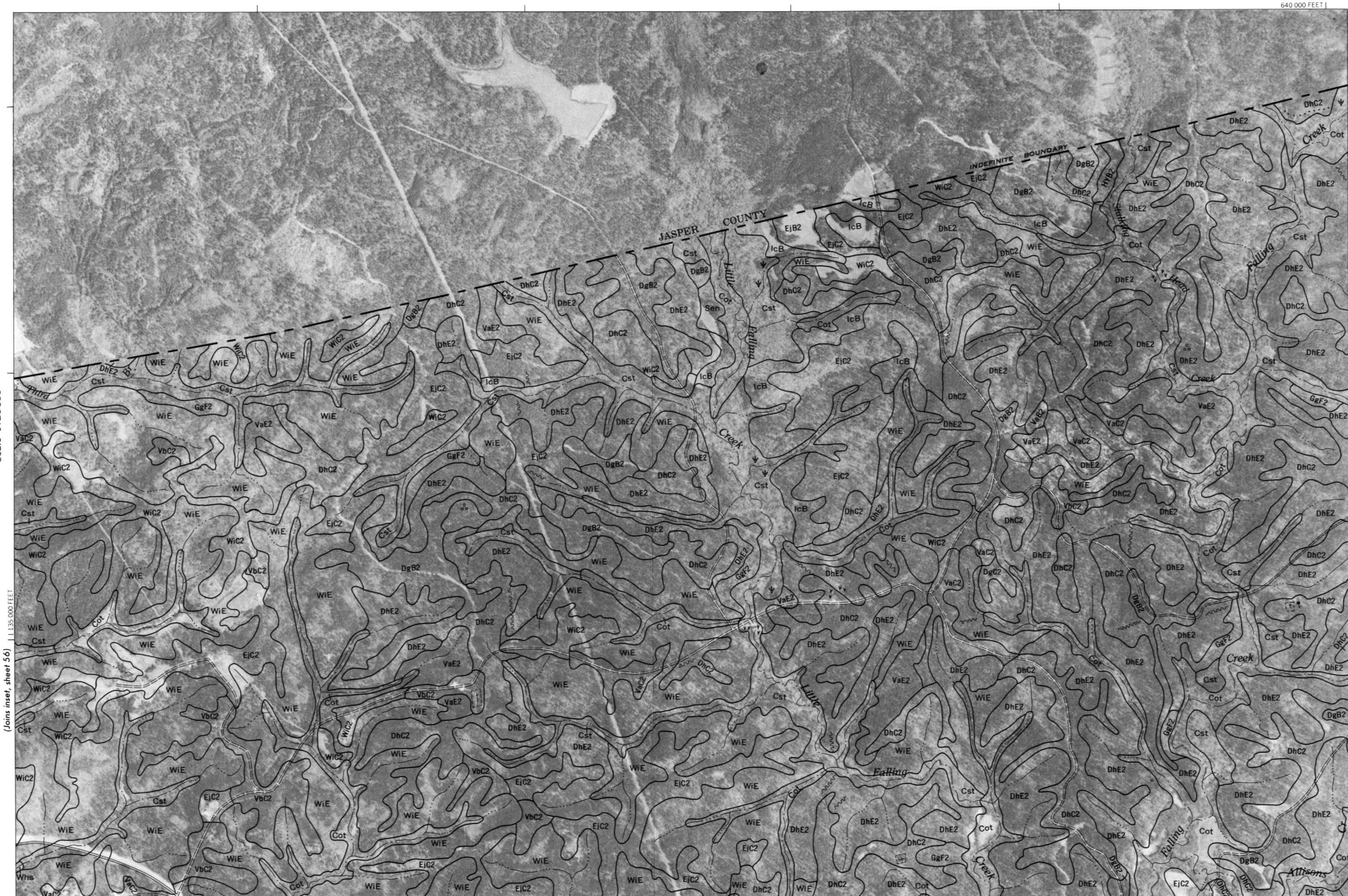
0 | 1000 | 2000 | 3000 | 4000 | 5000

0 | ¼ | ½ | ¾ | 1

640 000 FEET

1 145 000 FEET

1 135 000 FEET



(Joins inset, sheet 56)

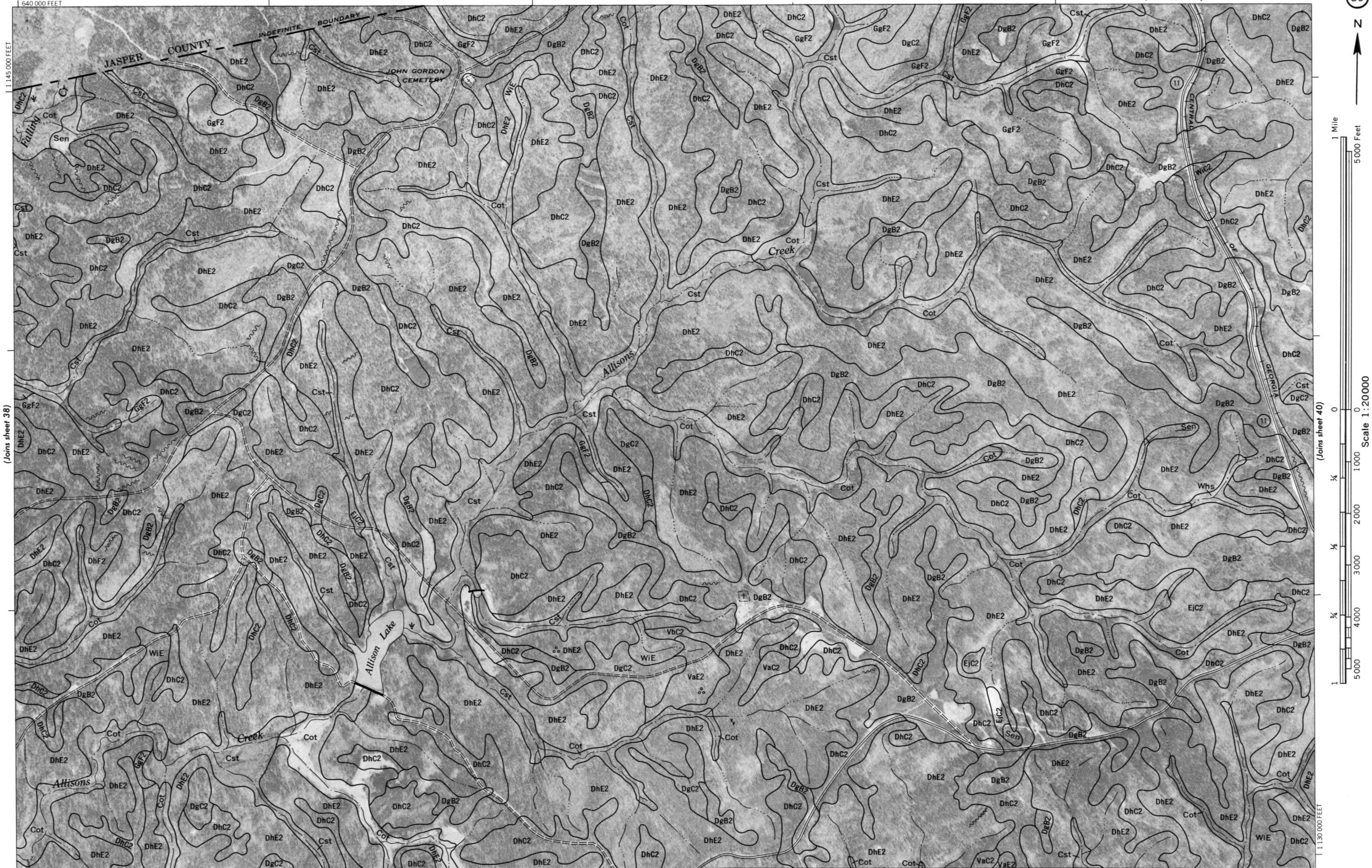
(Joins sheet 39)

(Joins sheet 47)

620 000 FEET

This map is compiled on 1972 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

(Joins sheet 30)

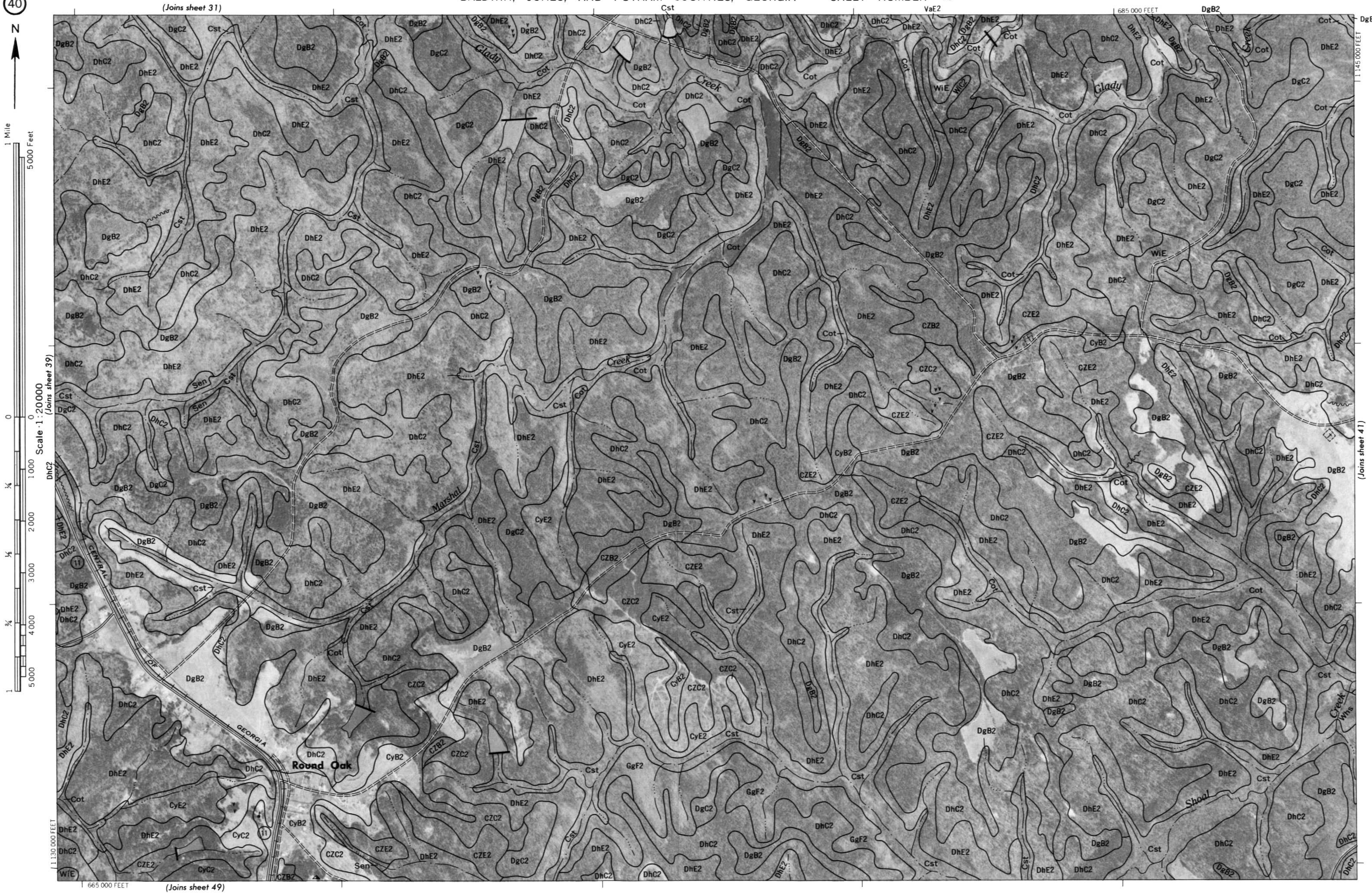


(Joins sheet 38)

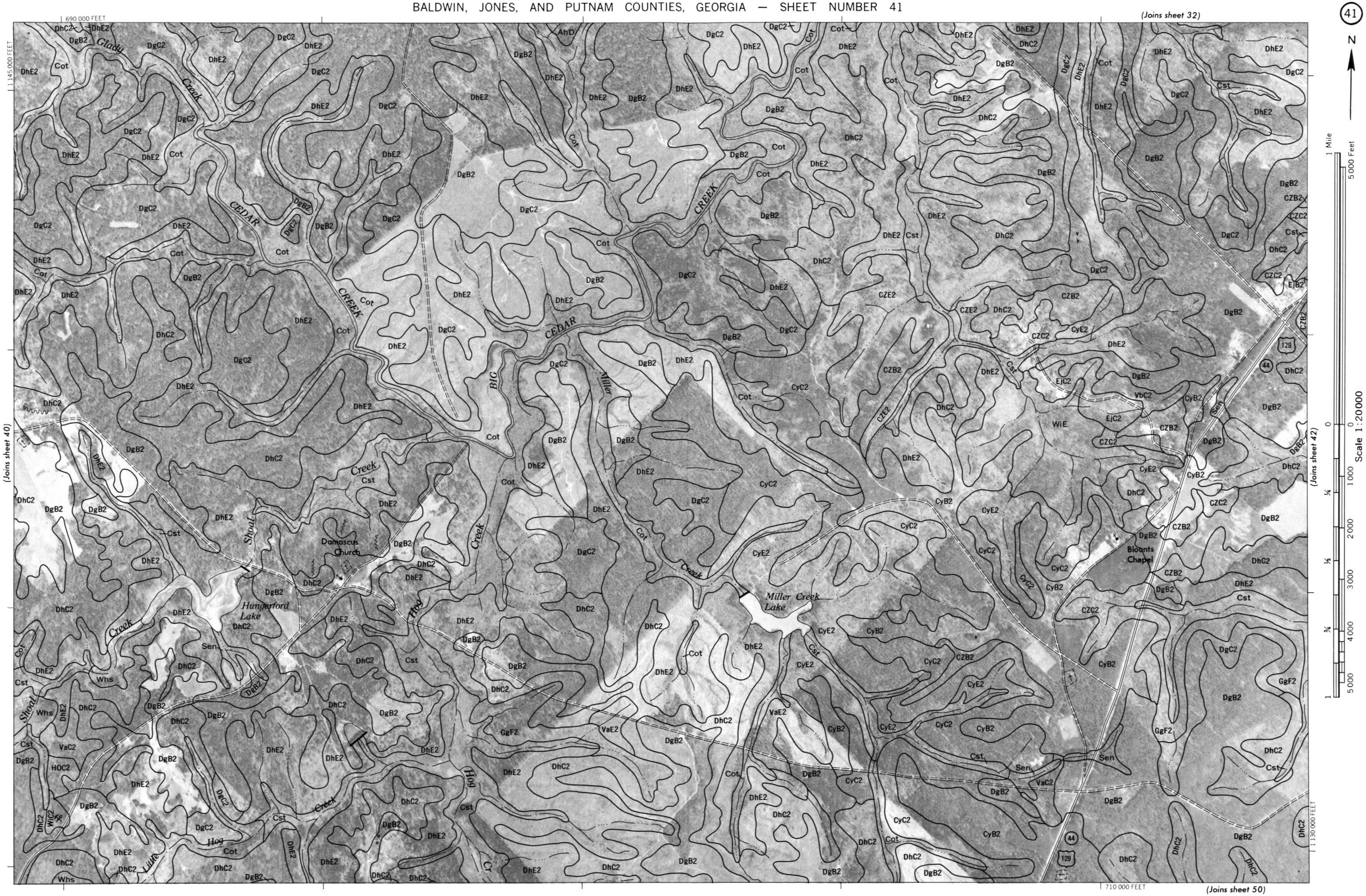
(Joins sheet 40)

(Joins sheet 48)

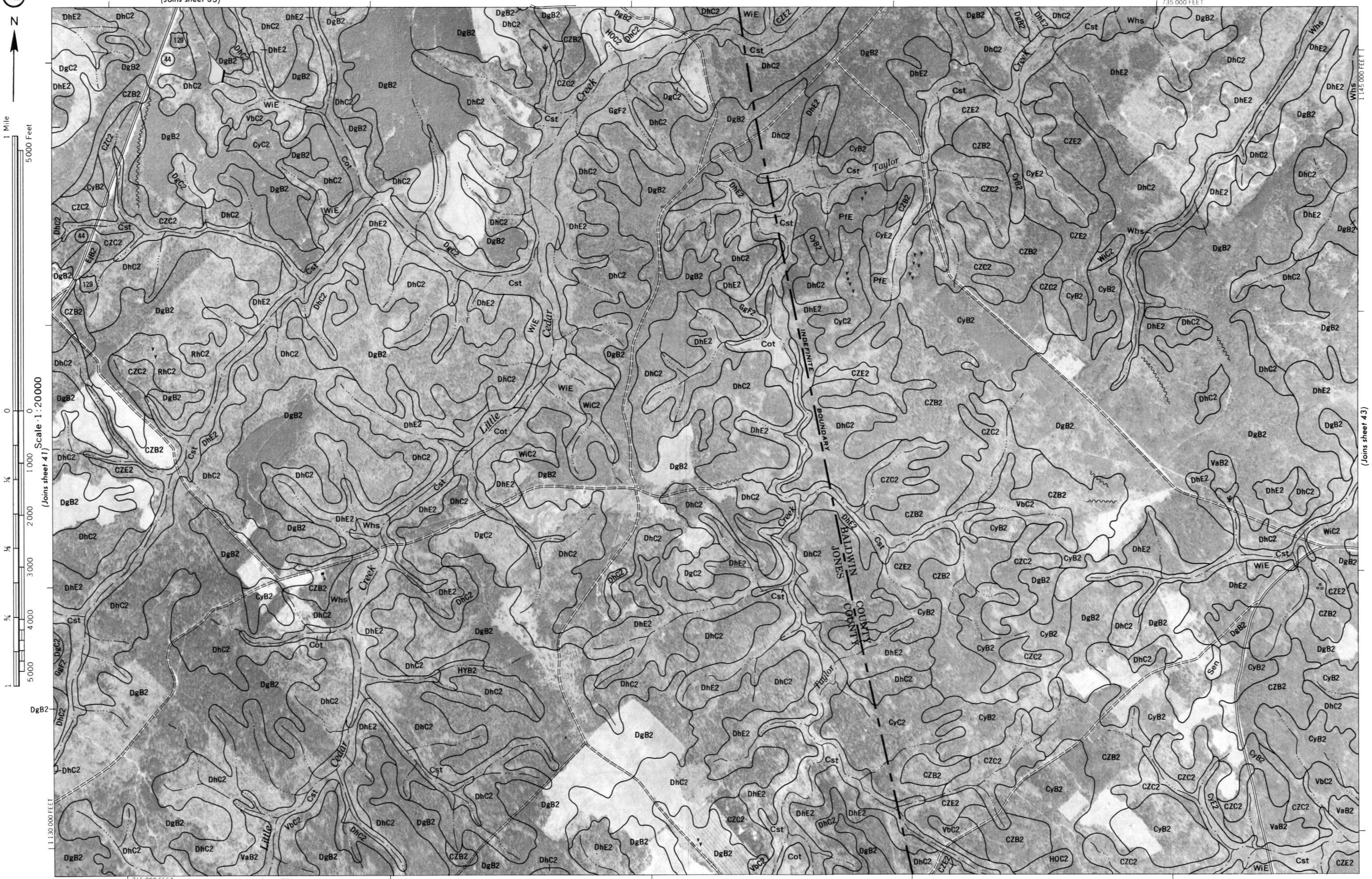
This map is compiled on 1972 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.



This map is compiled on 1972 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.



This map is compiled on 1972 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.



This map is compiled on 1972 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

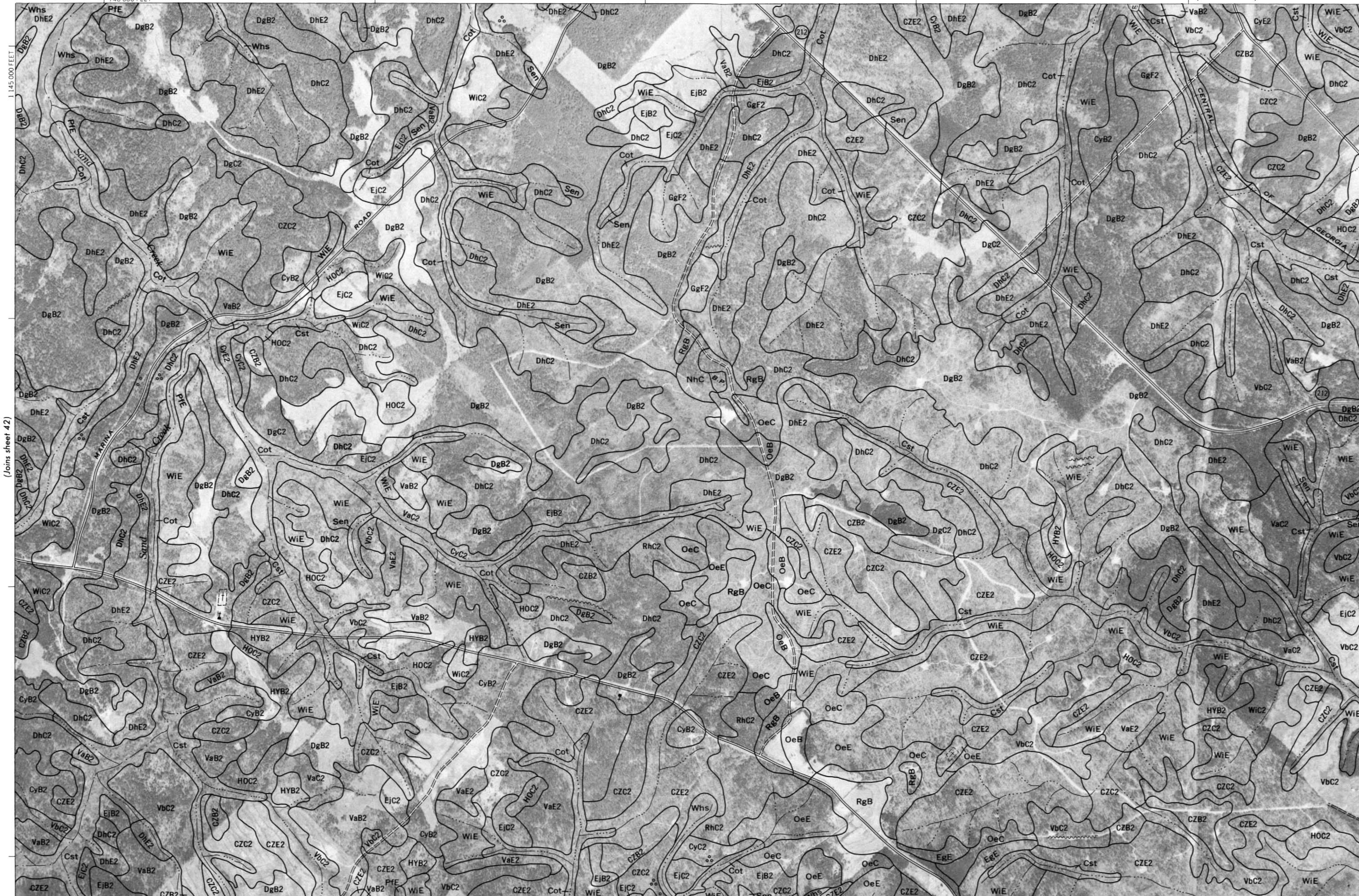
43

(Joins sheet 34)

(Joins sheet 42)

(Joins sheet 44)

(Joins sheet 52)



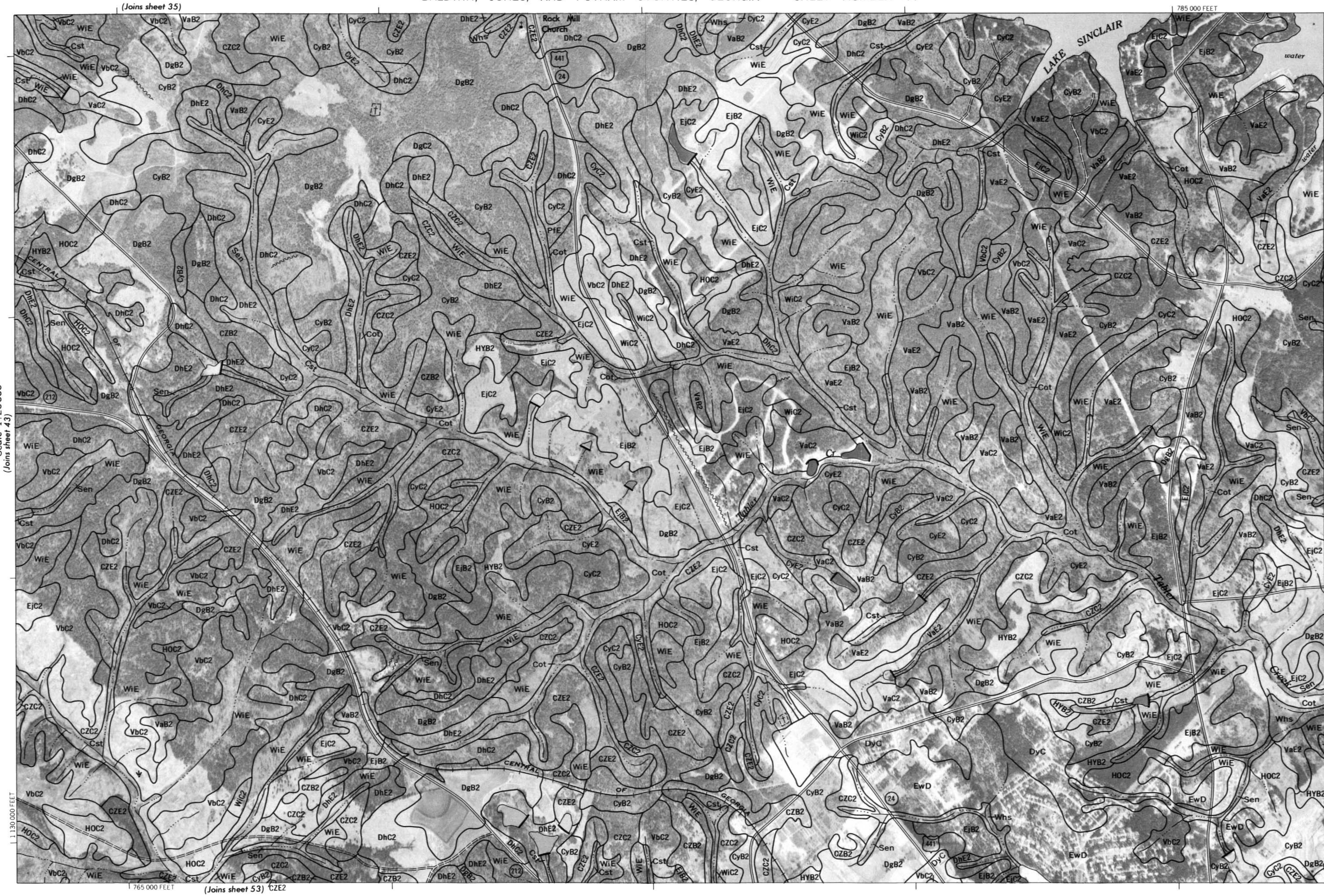
Scale 1:20000

1 Mile | 0 | ¼ | ½ | ¾ | 1

5000 Feet | 0 | 1000 | 2000 | 3000 | 4000 | 5000

This map is compiled on 1972 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

N



1 Mile
5000 Feet
Scale 1:20000
0 1000 2000 3000 4000 5000
0 ¼ ½ ¾ 1

This map is compiled on 1972 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

This map is compiled on 1972 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

N

1 Mile

5000 Feet

Scale 1:20000

0 1000 2000 3000 4000 5000

0 ¼ ½ ¾ 1

(Joins sheet 37)

(Joins sheet 45)

(Joins sheet 55)

(Joins inset, sheet 55)

(Joins sheet 64)

(Joins sheet 74)

This map is compiled on 1972 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

47

(Joins sheet 38)

(Joins inset sheet 56)

(Joins sheet 48)

(Joins sheet 56)

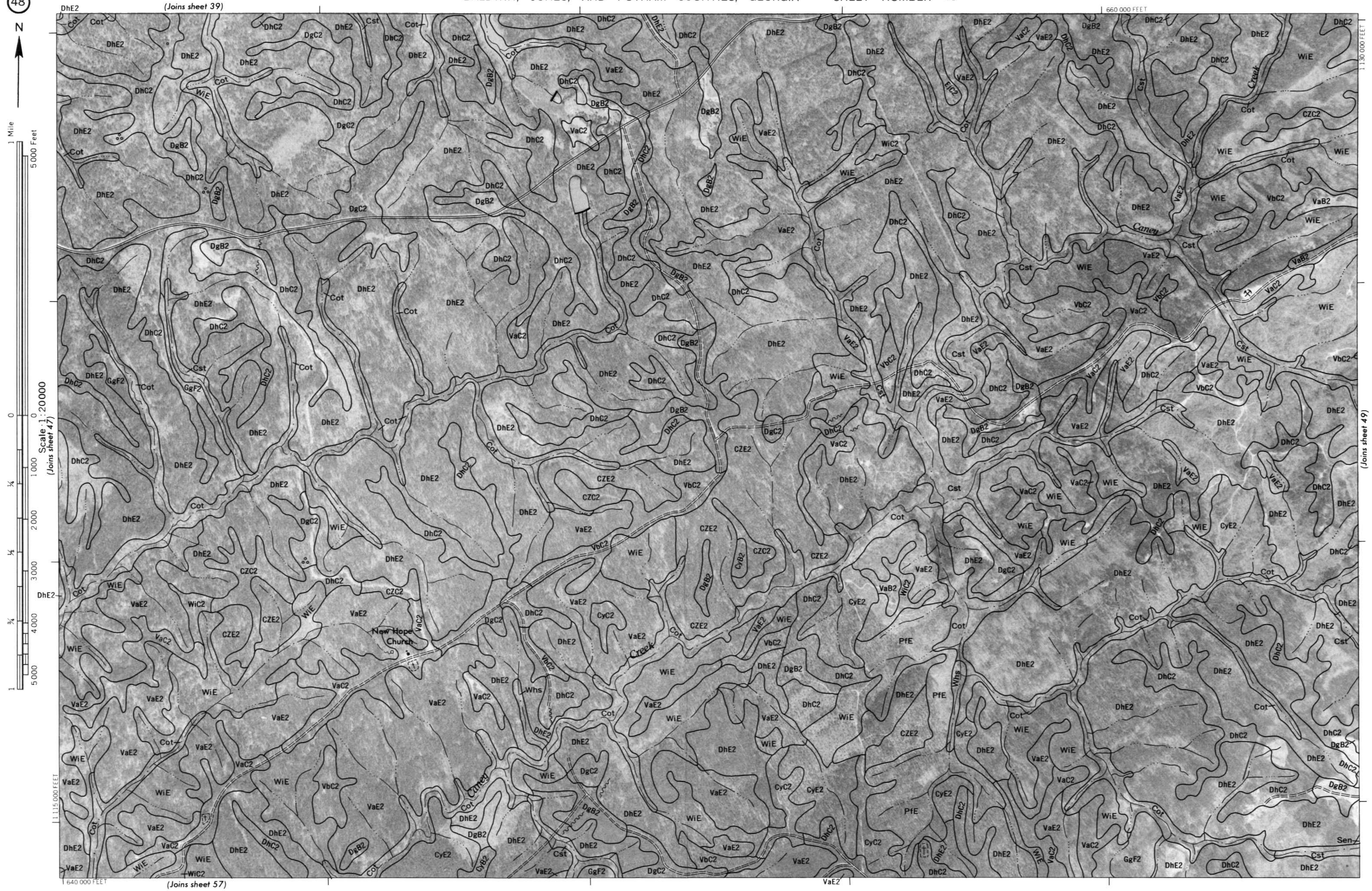
Scale 1:20000

1 Mile
0 1/4 1/2 3/4 1

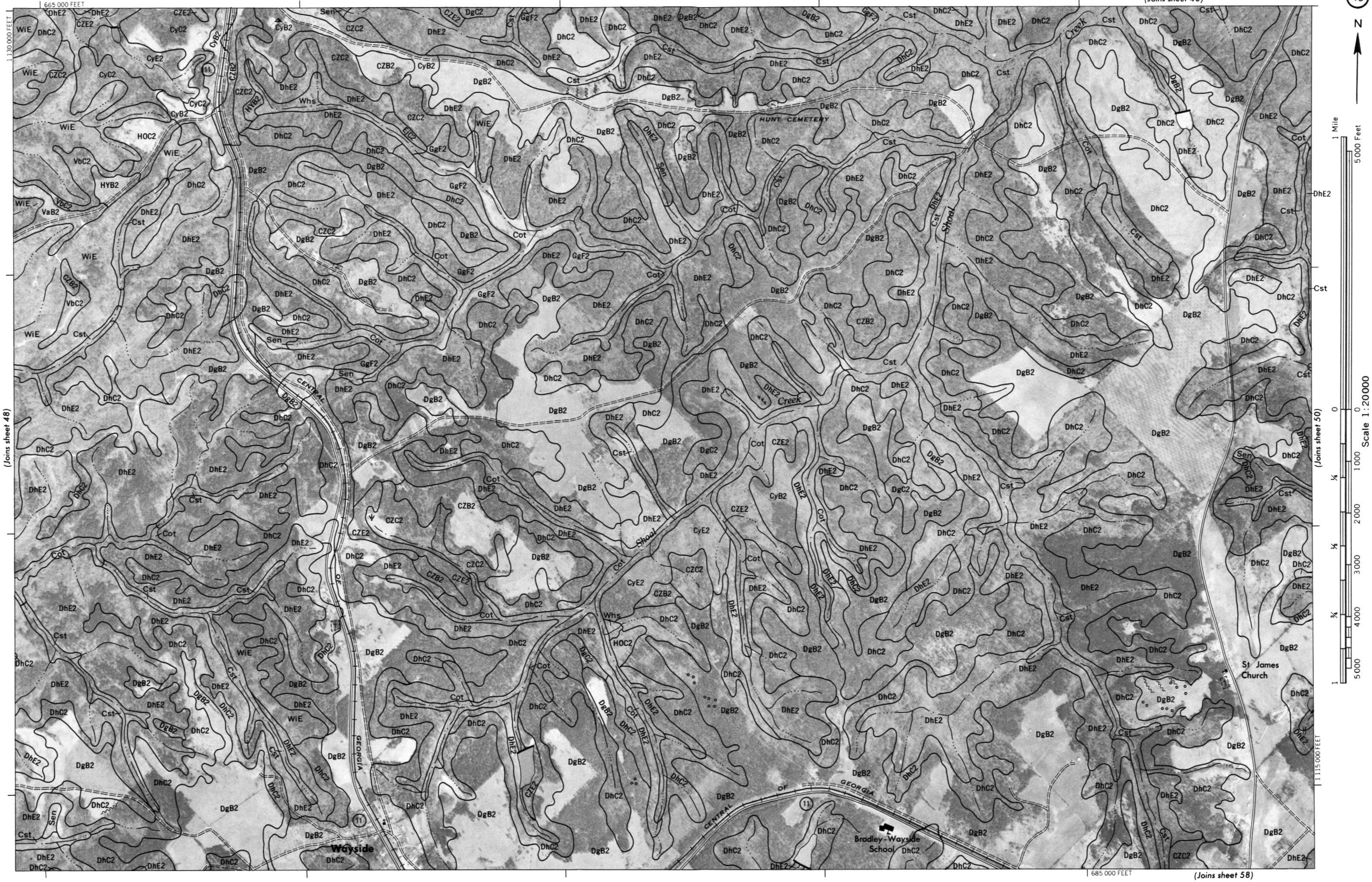
5000 Feet
0 1000 2000 3000 4000 5000

This map is compiled on 1972 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

BALDWIN, JONES, AND PUTNAM COUNTIES, GEORGIA — SHEET NUMBER 48



This map is compiled on 1972 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.



This map is compiled on 1972 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

(Joins sheet 41)

N

1 Mile

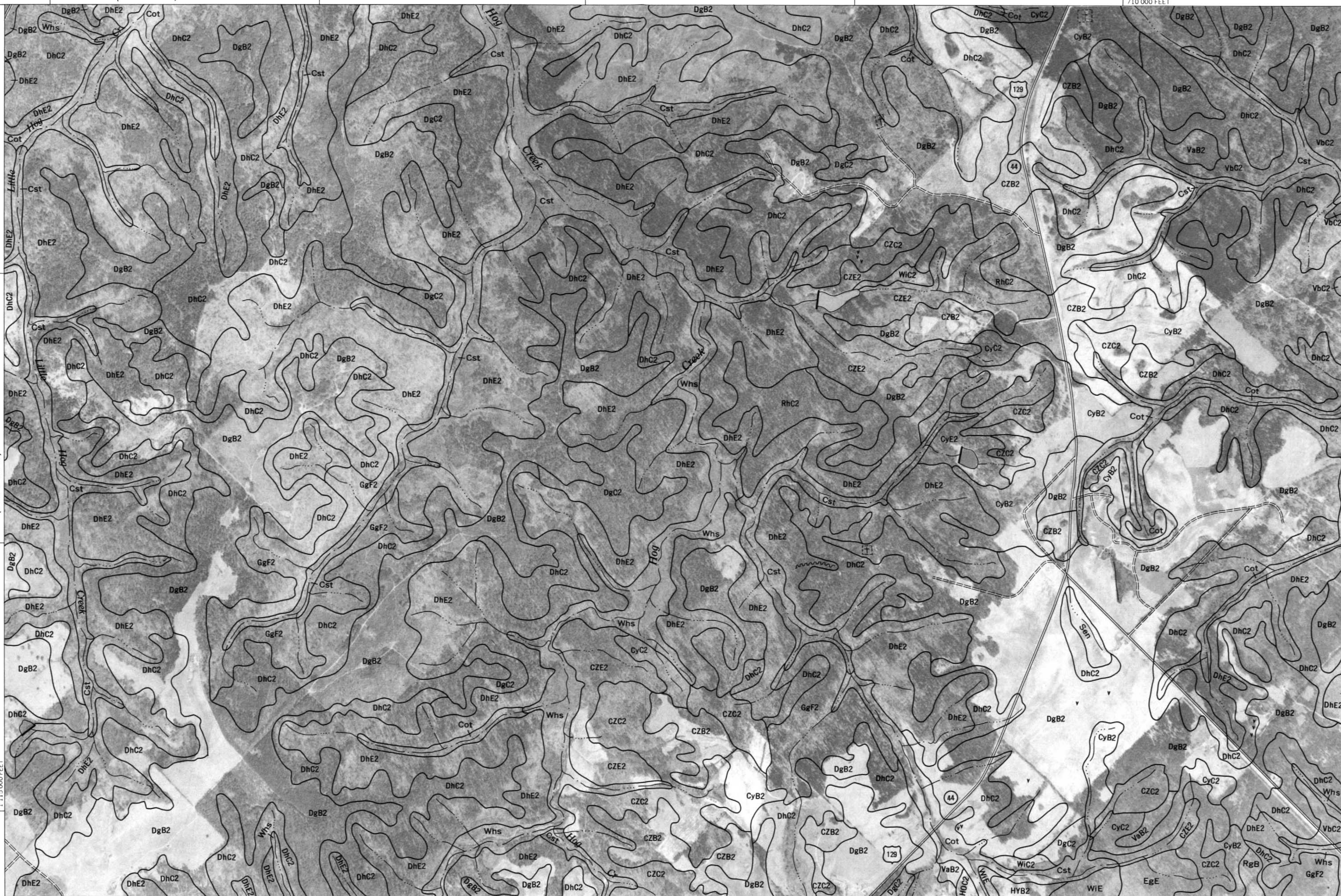
5000 Feet

Scale 1:20000

0 1000 2000 3000 4000 5000

0 ¼ ½ ¾ 1

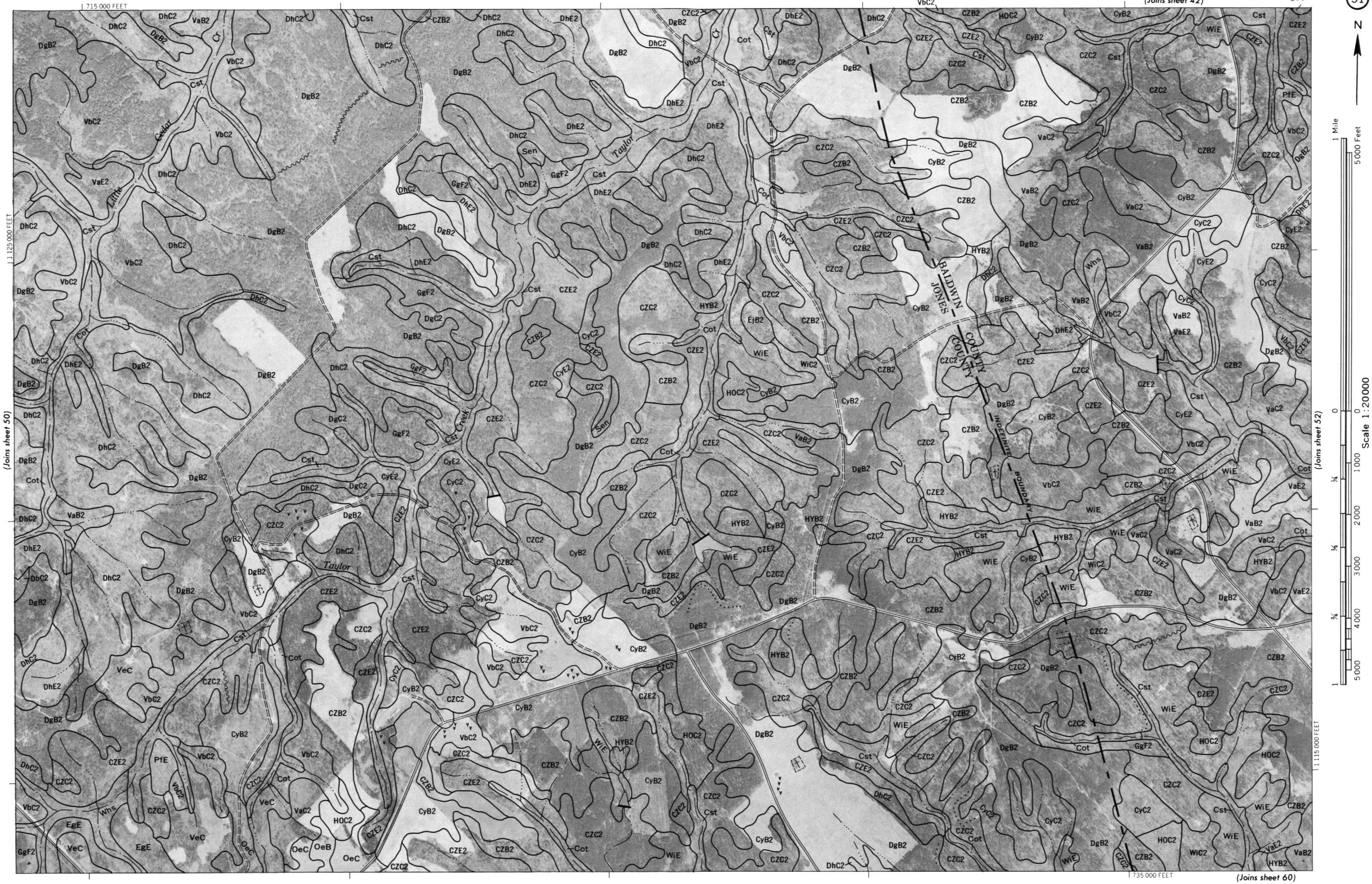
(Joins sheet 49)



(Joins sheet 51)

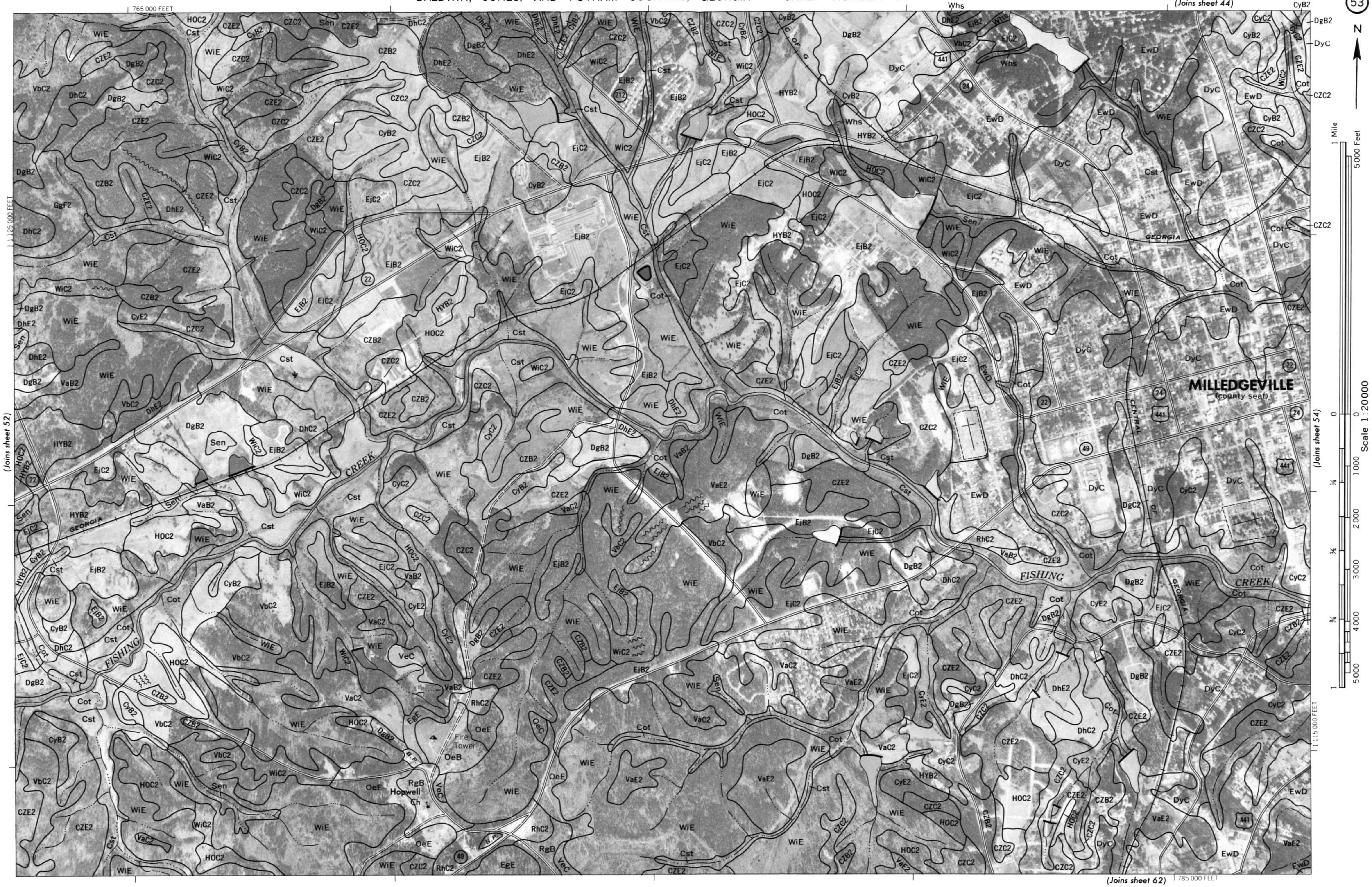
(Joins sheet 59)

This map is compiled on 1972 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.



This map is compiled on 1972 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

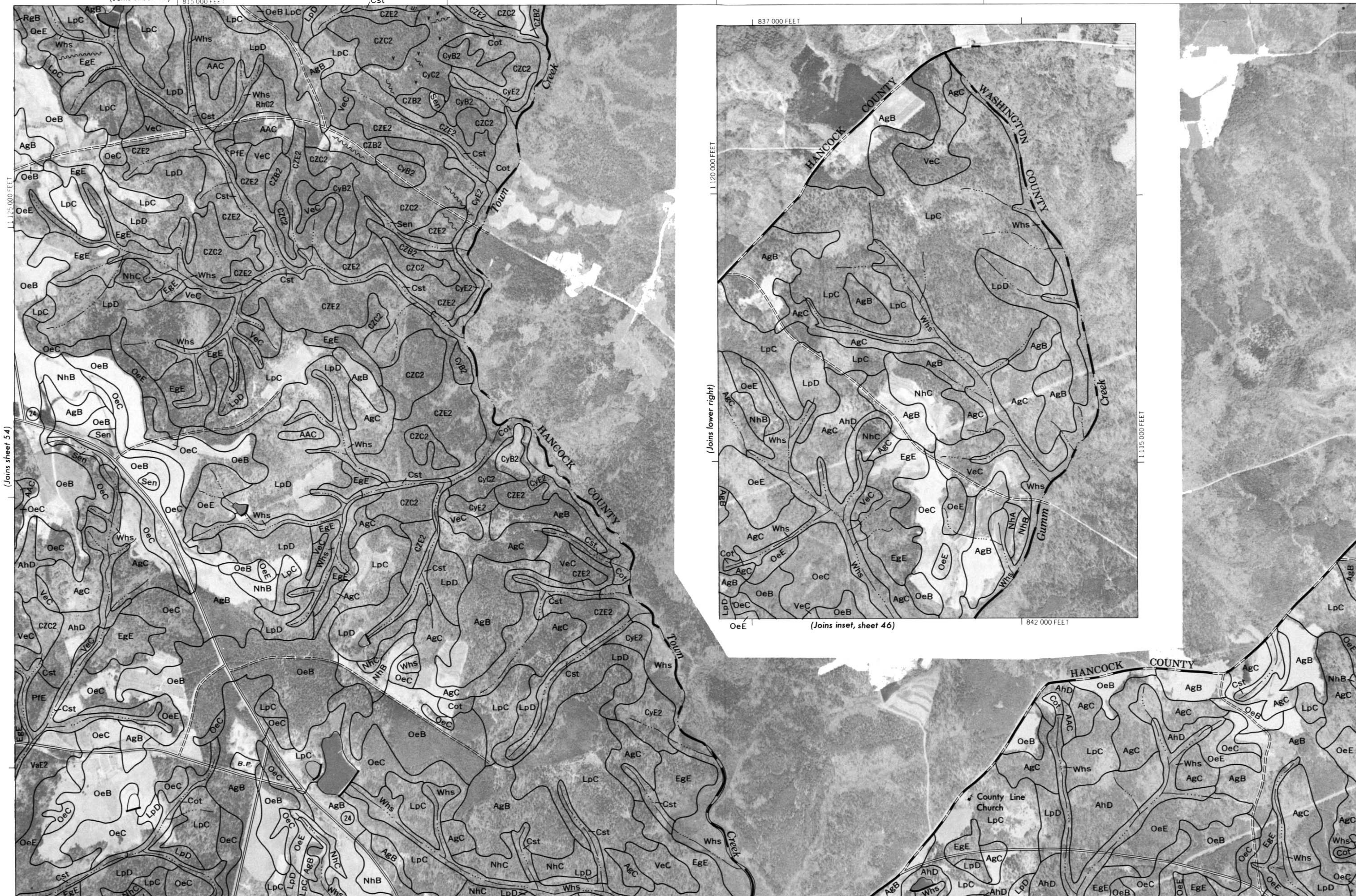
This map is compiled on 1972 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.



This map is compiled on 1972 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

This map is compiled on 1972 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

55



N

Scale 1:20000

1 Mile

5000 Feet

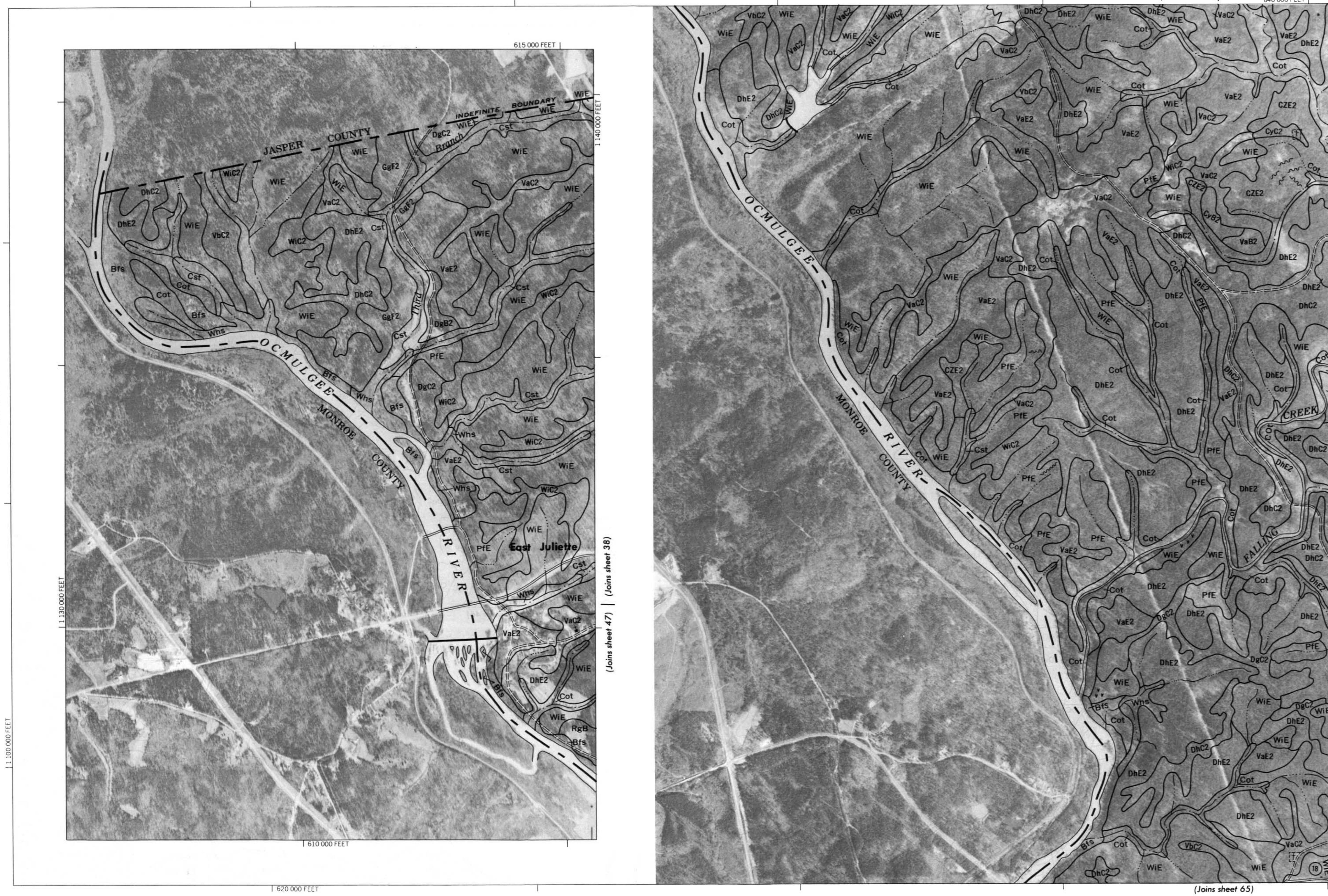
This map is compiled on 1972 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

N

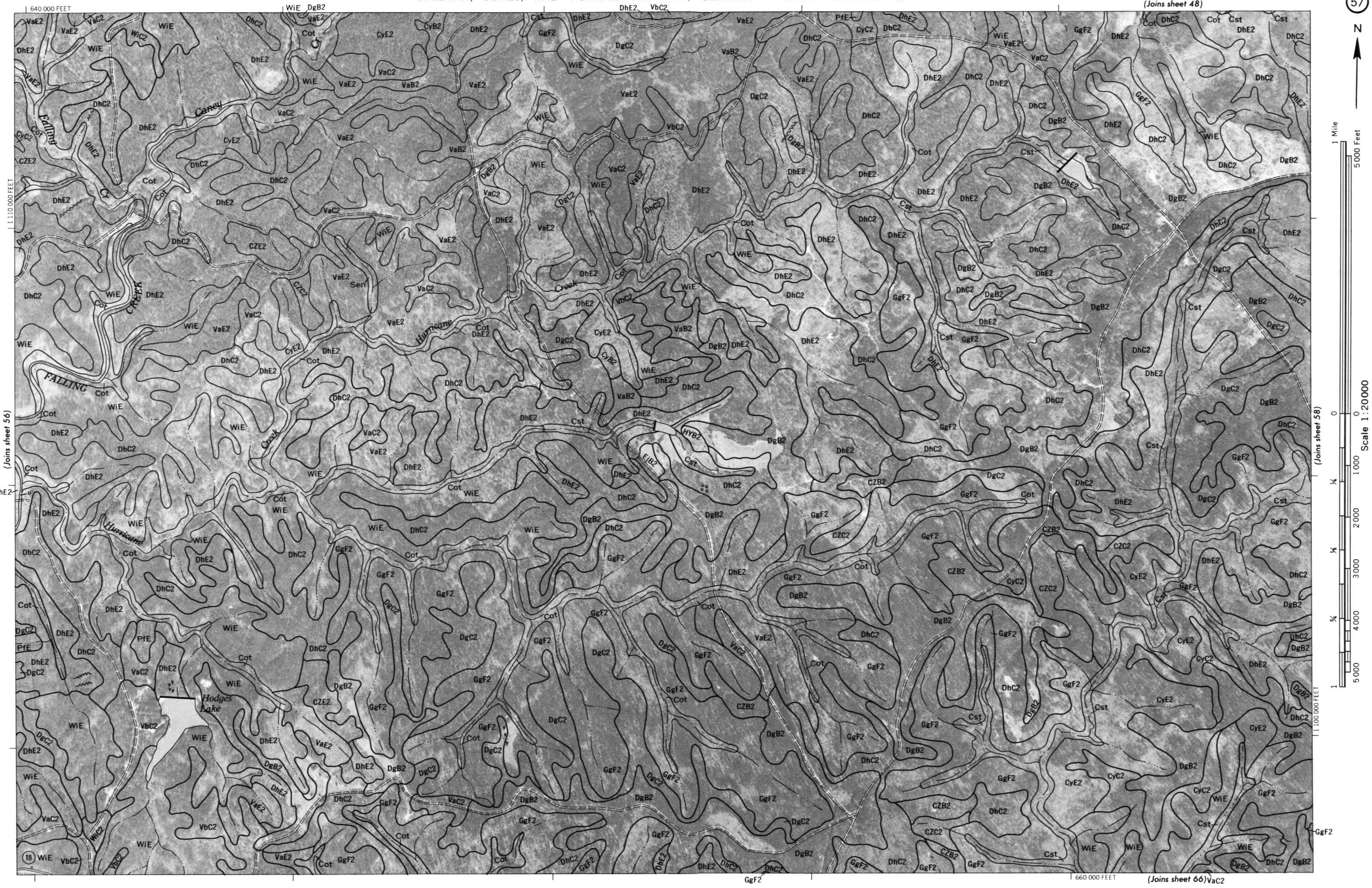
1 Mile

5000 Feet

Scale 1:20000

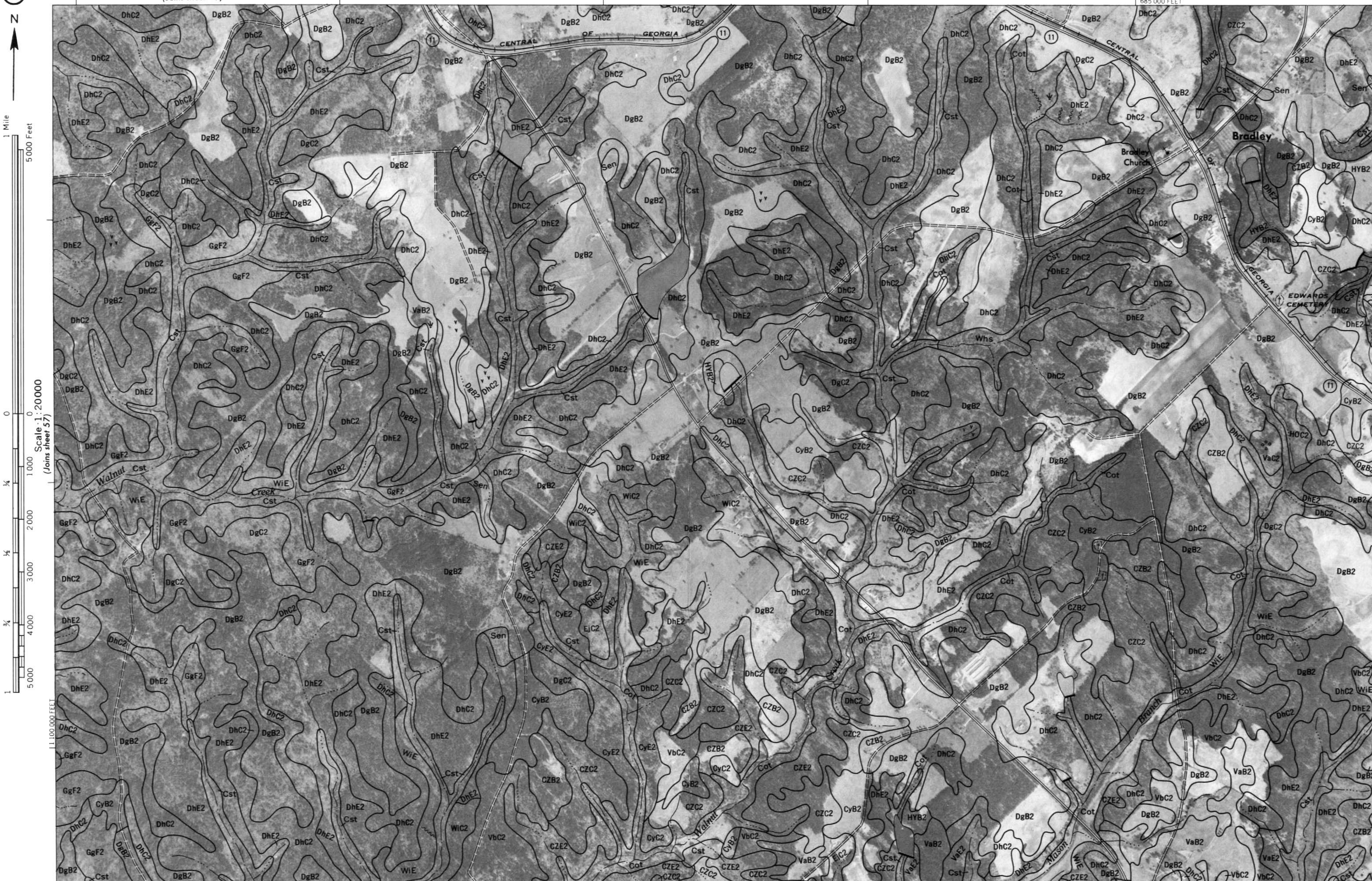


This map is compiled on 1972 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies
Coordinate grid ticks and land division corners, if shown, are approximately positioned



This map is compiled on 1972 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

(Joins sheet 49)



(Joins sheet 57)

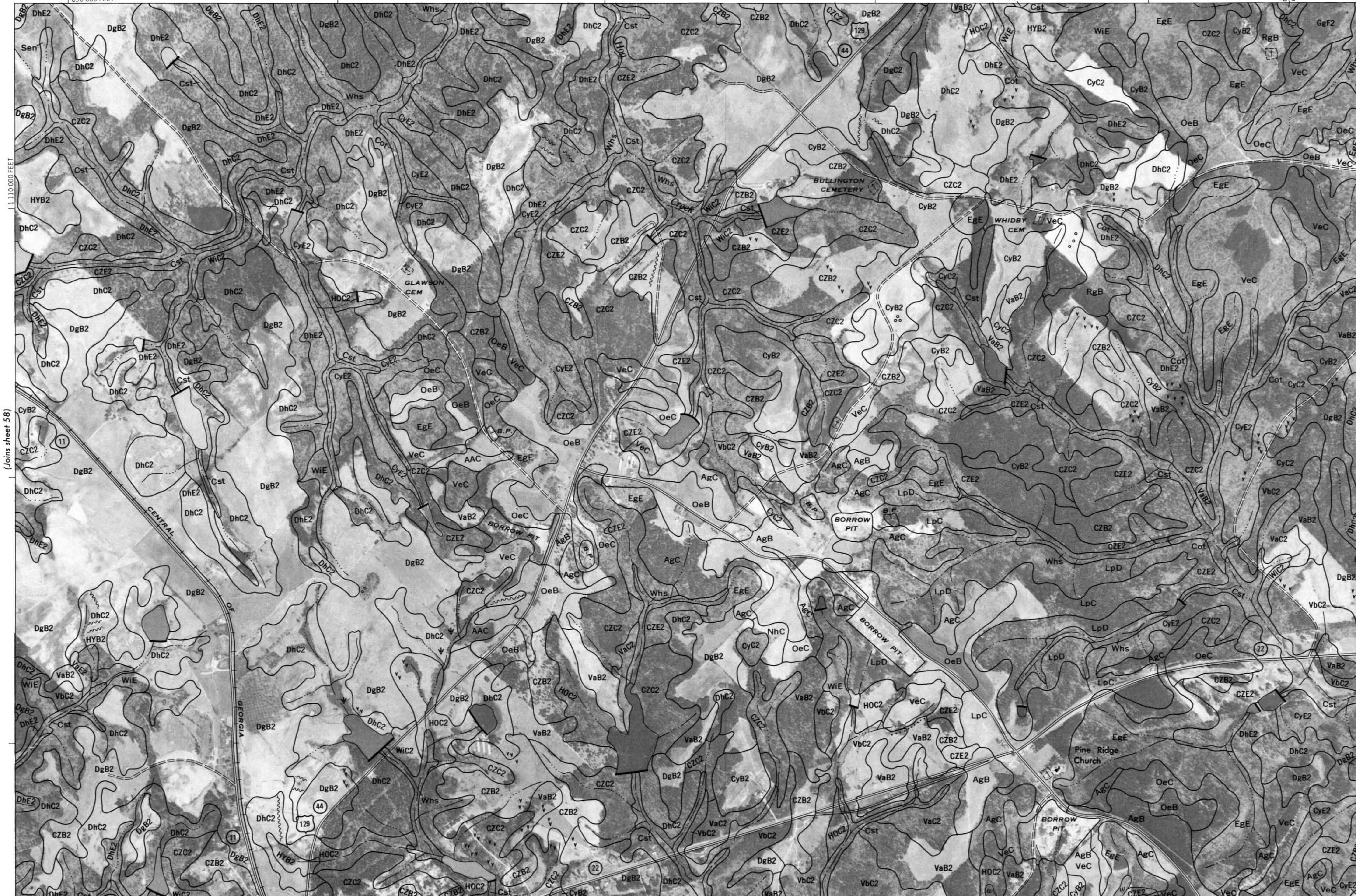
(Joins sheet 59)

(Joins sheet 67)

This map is compiled on 1972 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies
Coordinate grid ticks and land division corners, if shown, are approximately positioned

59

(Joins sheet 50)



(Joins sheet 58)

(Joins sheet 60)

(Joins sheet 68)

N

Scale 1:20000

1 Mile

5000 Feet

0 1000 2000 3000 4000 5000

0 ¼ ½ ¾ 1

This map is compiled on 1972 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

(Joins sheet 51)

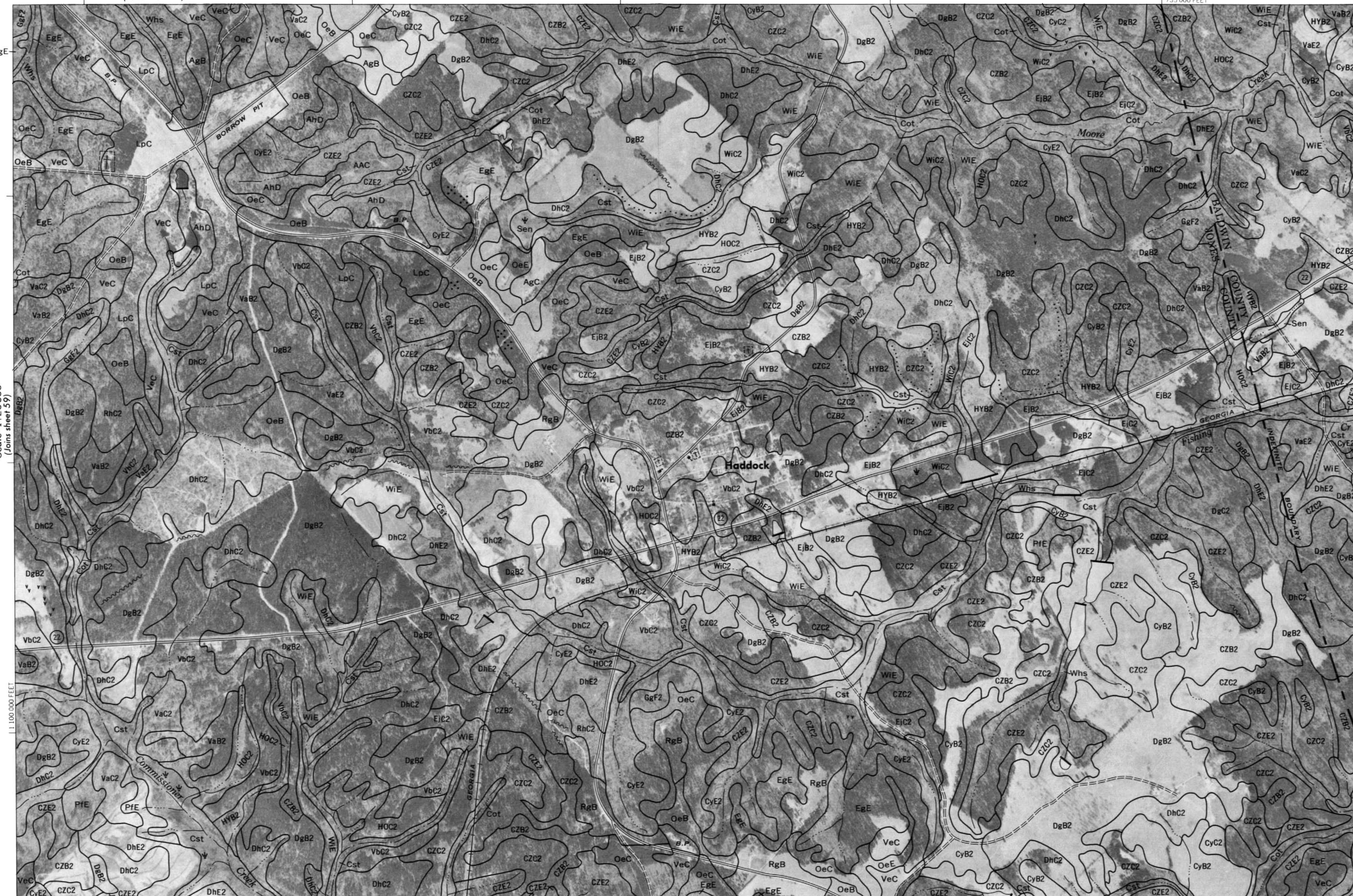
N

Scale 1:20000

1 Mile 0 ¼ ½ ¾ 1

5000 Feet 0 1000 2000 3000 4000 5000

(Joins sheet 59)



(Joins sheet 61)

(Joins sheet 69)

This map is compiled on 1972 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

(61)

This map is compiled on 1972 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

N

1 Mile
5000 Feet
0
1000
2000
3000
4000
5000
Scale 1:20000

BALDWIN, JONES, AND PUTNAM COUNTIES, GEORGIA — SHEET NUMBER 62

(Joins sheet 53)

N

1 Mile

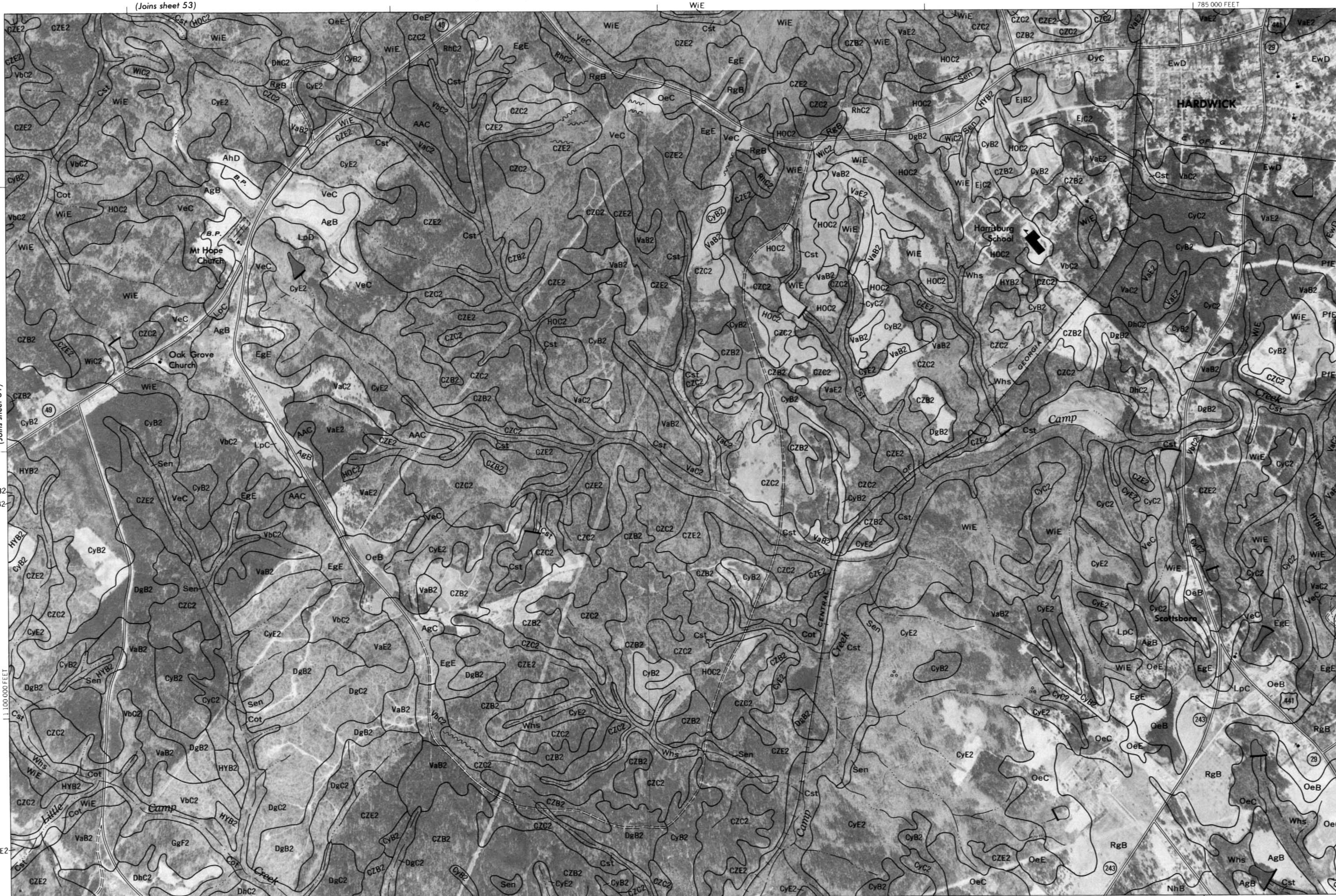
5000 Feet

Scale 1:20 000

(Joins sheet 61)

0 1000 2000 3000 4000 5000

0 ¼ ½ ¾ 1



(Joins sheet 63)

(Joins sheet 71)

This map is compiled on 1972 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

This map is compiled on 1972 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

This map is compiled on 1972 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

620 000 FEET

1 095 000 FEET

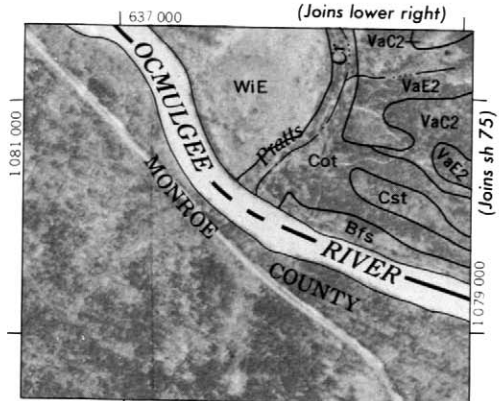
(Joins sheet 56)

(Joins sheet 66)

N

Scale 1:20000

1 Mile
0 ¼ ½ ¾ 1
5000 Feet
0 1000 2000 3000 4000 5000



2000 AND 3000-FOOT GRID TICKS

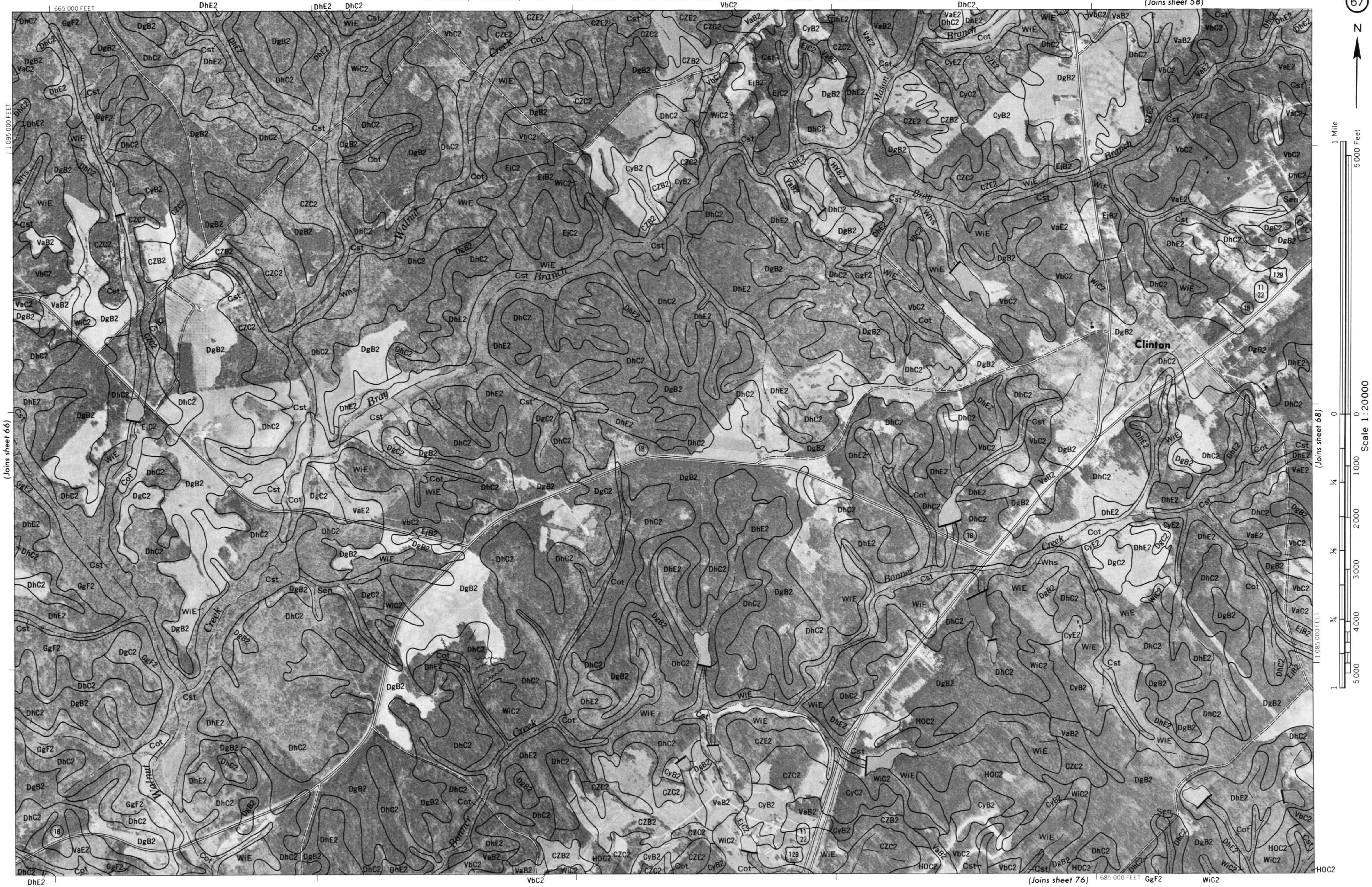
1 085 000 FEET

635 000 FEET

(Joins inset)

This map is compiled on 1972 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

This map is compiled on 1972 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.



This map is compiled on 1972 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned

(Joins sheet 59)

N

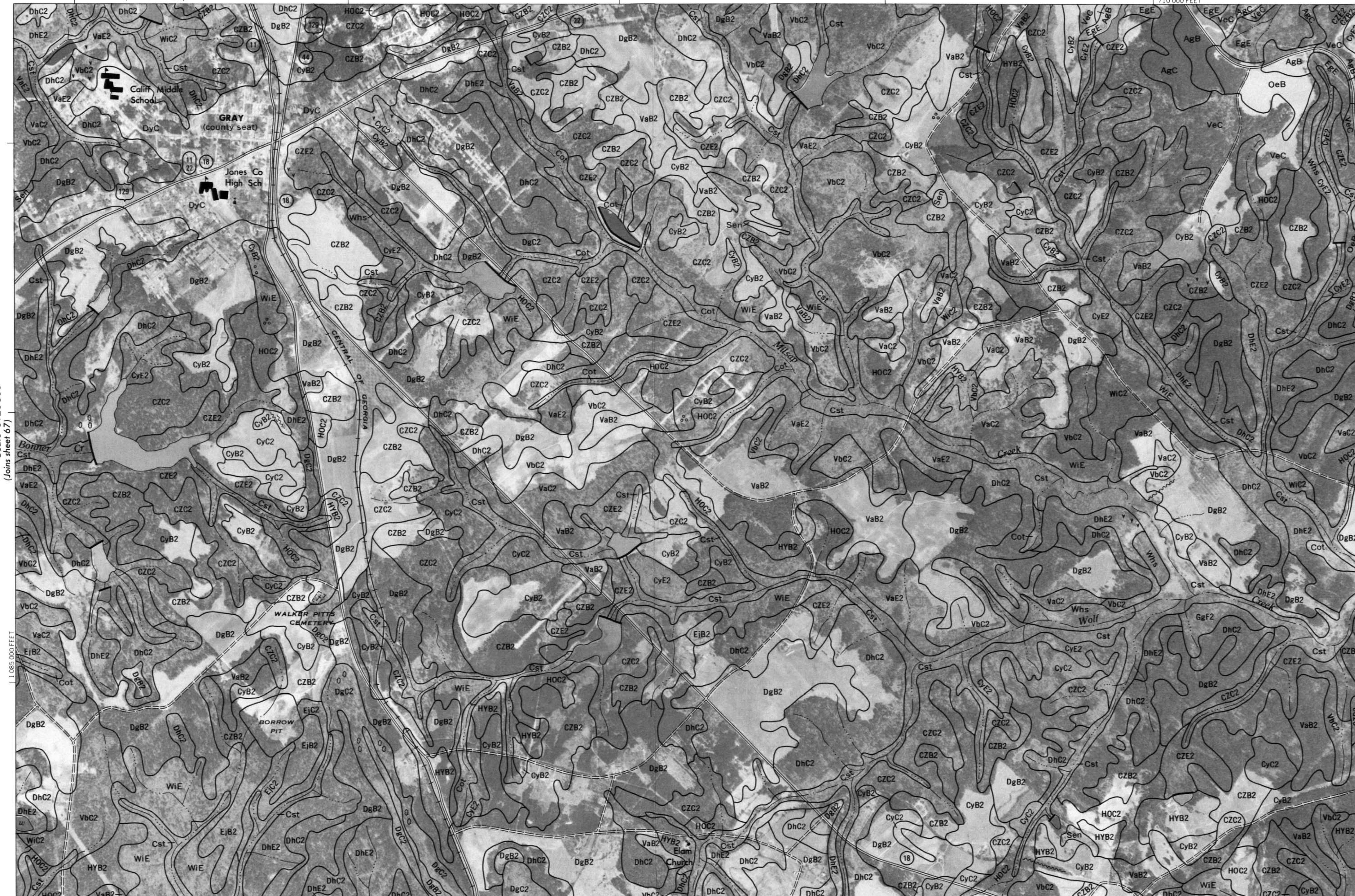
1 Mile
5000 Feet

Scale 1:20 000

0 1000 2000 3000 4000 5000

0 ¼ ½ ¾ 1

(Joins sheet 67)



(Joins sheet 69)

(Joins sheet 77)

This map is compiled on 1972 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.


69
N
(Joins sheet 60)
(Joins sheet 68)
(Joins sheet 70)
(Joins sheet 78)
715 000 FEET
735 000 FEET
1 095 000 FEET
1 085 000 FEET
1 Mile
5 000 Feet
Scale 1:20000
0
1000
2000
3000
4000
5000
¼
½
¾
1
Commissioner
Creek
Wolf
Wolf Creek
Little Creek
Commissioner Creek
CENTRAL OF GEORGIA
New Salem Church
B.P.
49
This map is compiled on 1972 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

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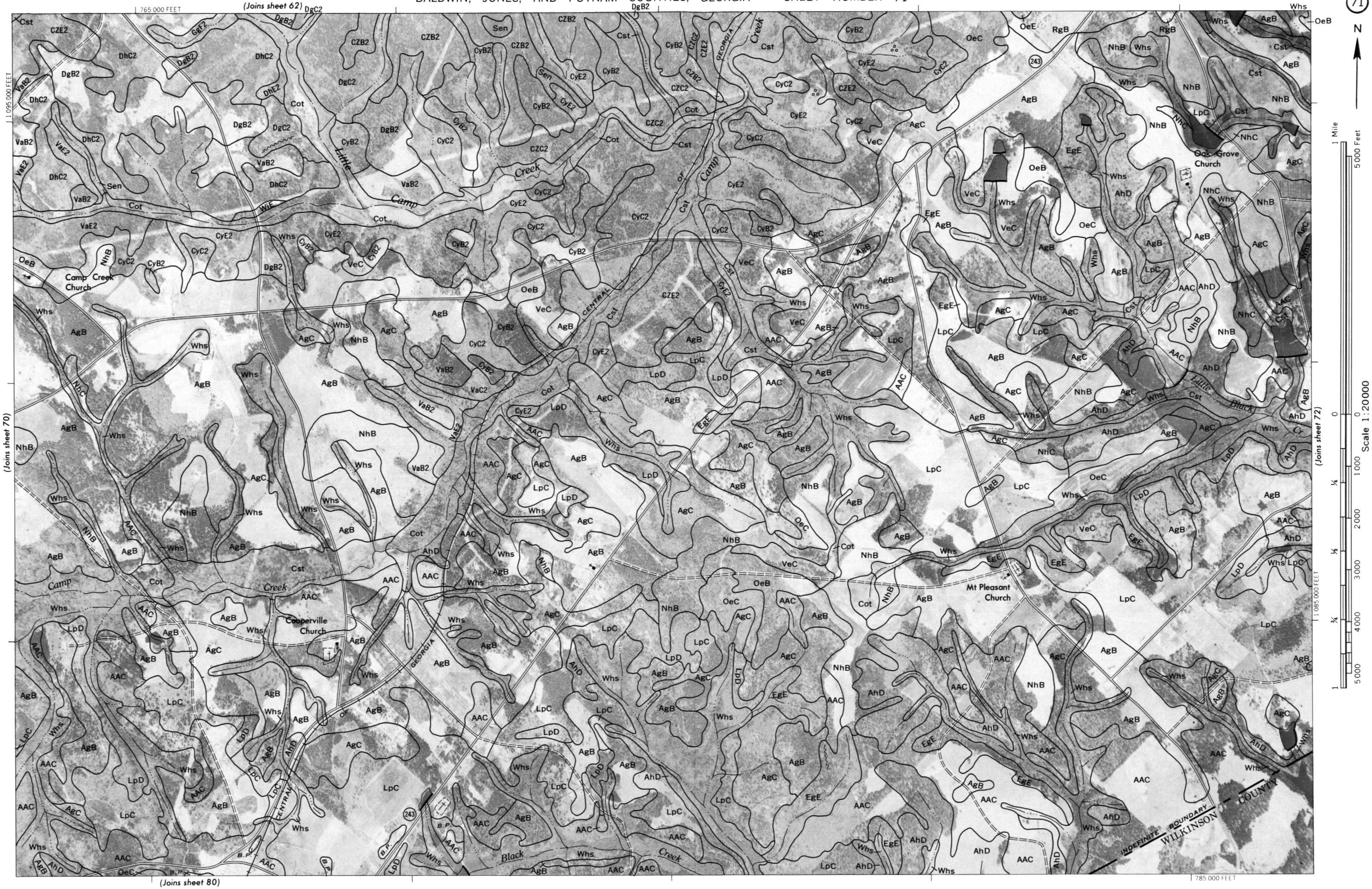

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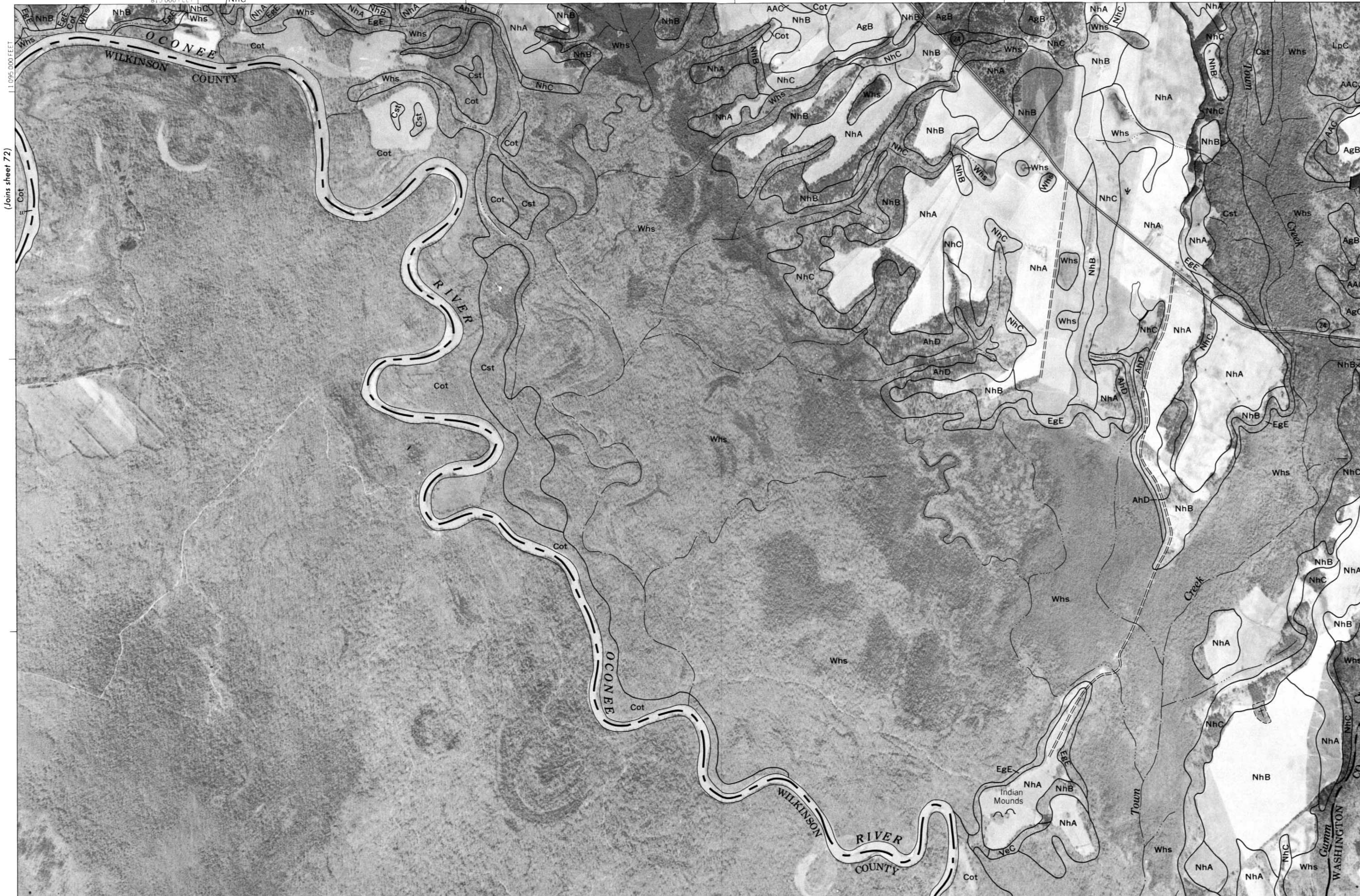
73

(Joins sheet 64)

(Joins sheet 72)



(Joins sheet 74)

(Joins inset, sheet 74)

N

Scale 1:20000

1 Mile

5000 Feet

0 1000 2000 3000 4000 5000

0 ¼ ½ ¾ 1

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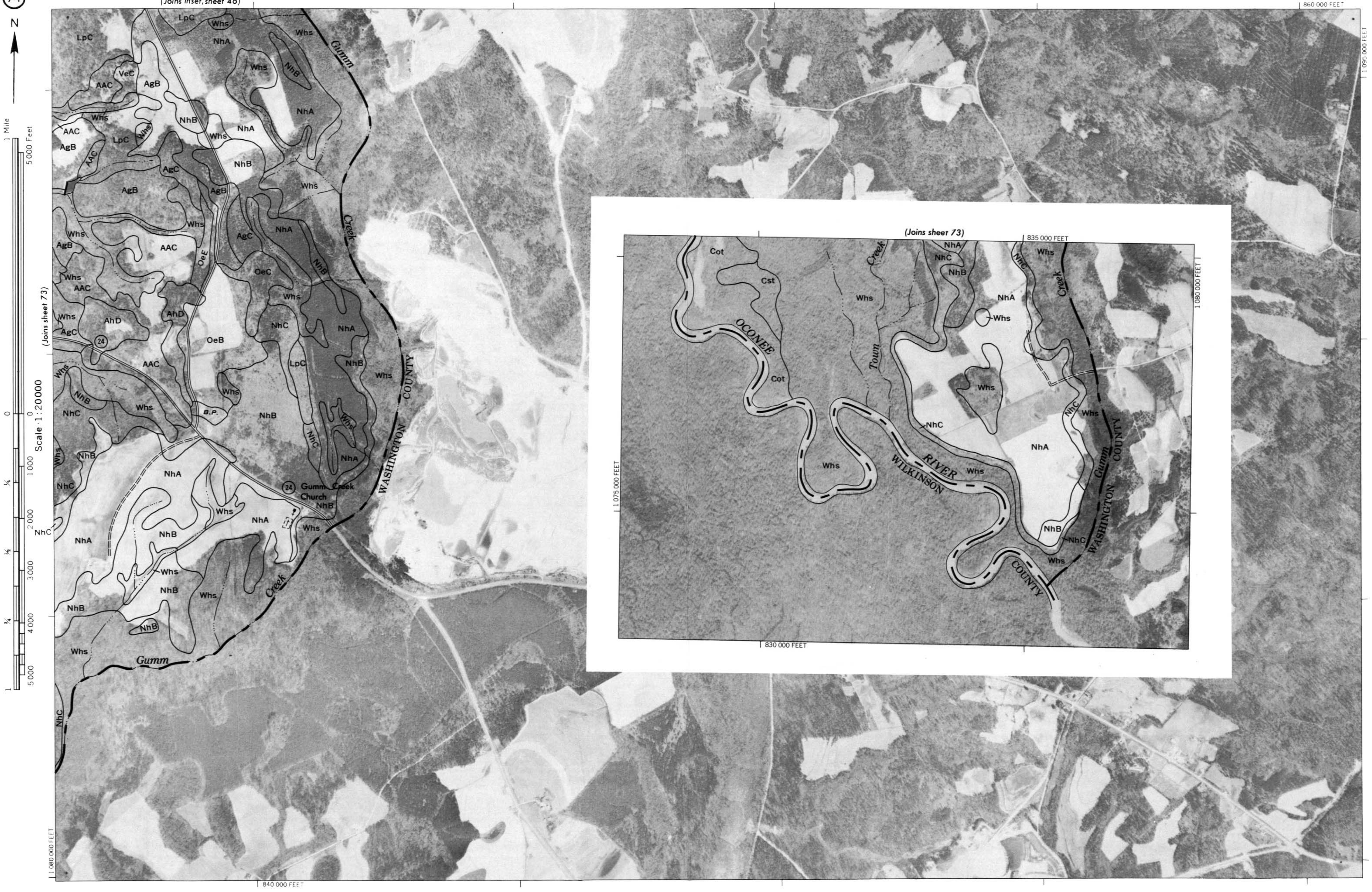

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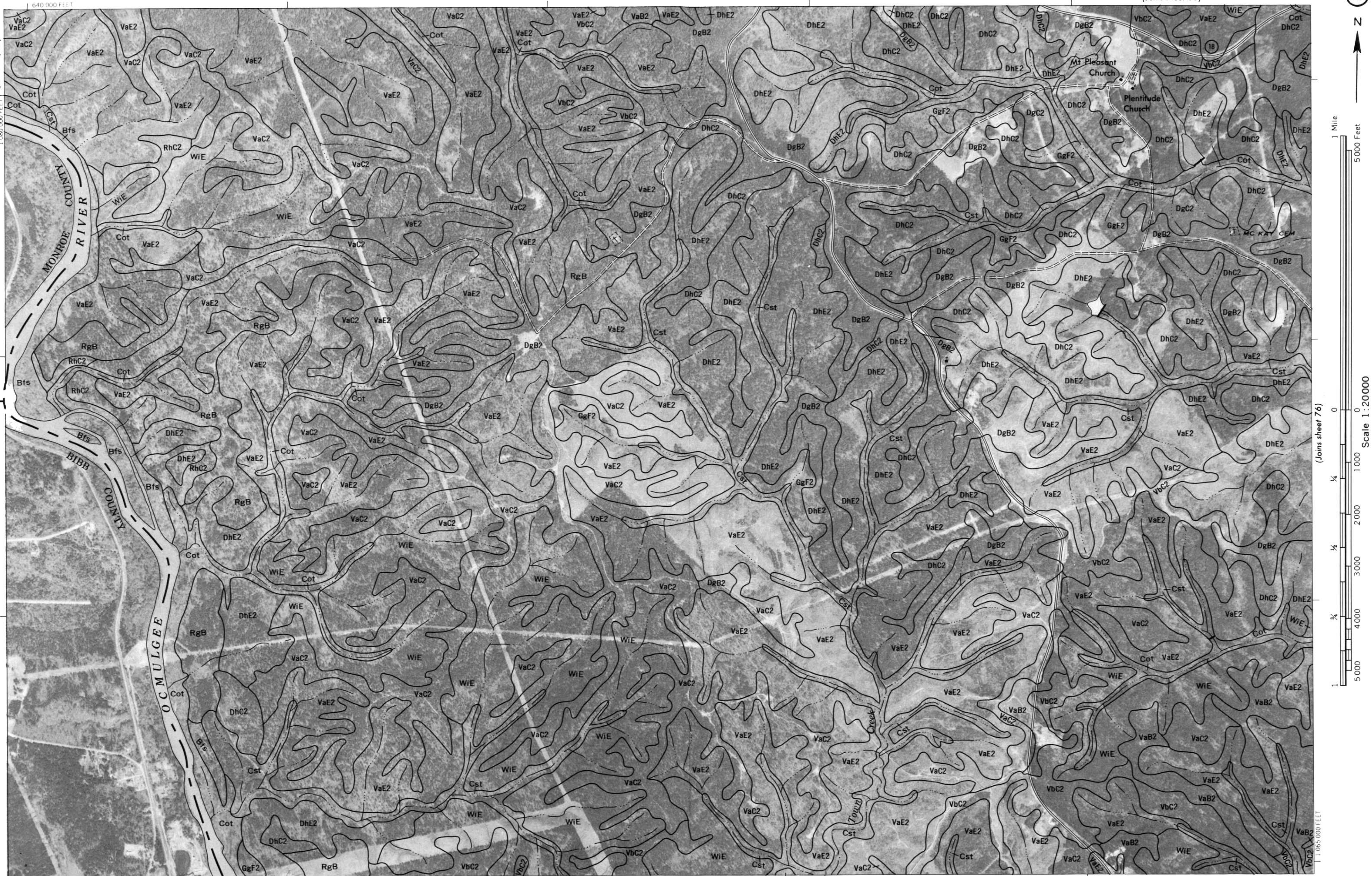

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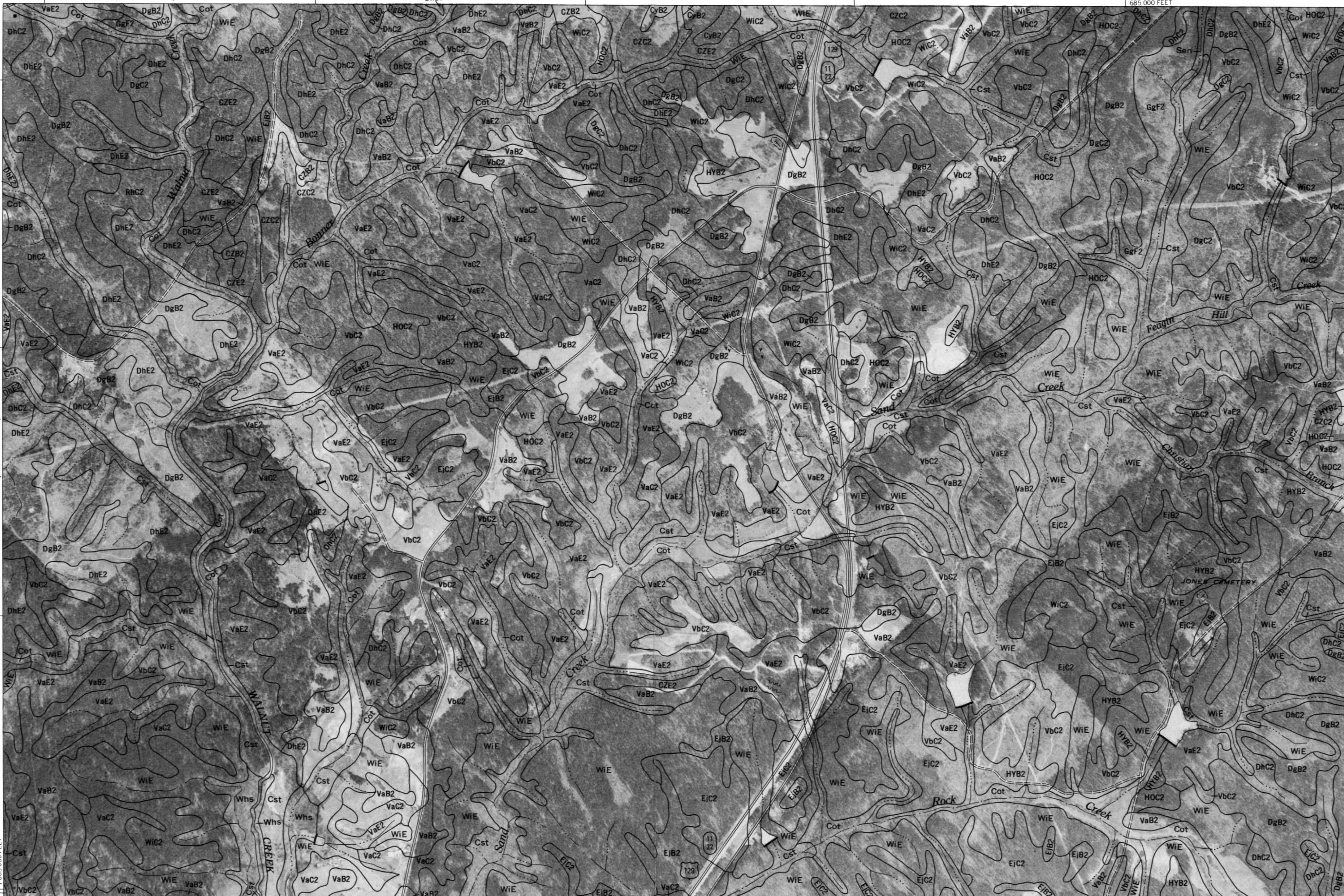
N

1 Mile

5000 Feet

Scale 1:20000



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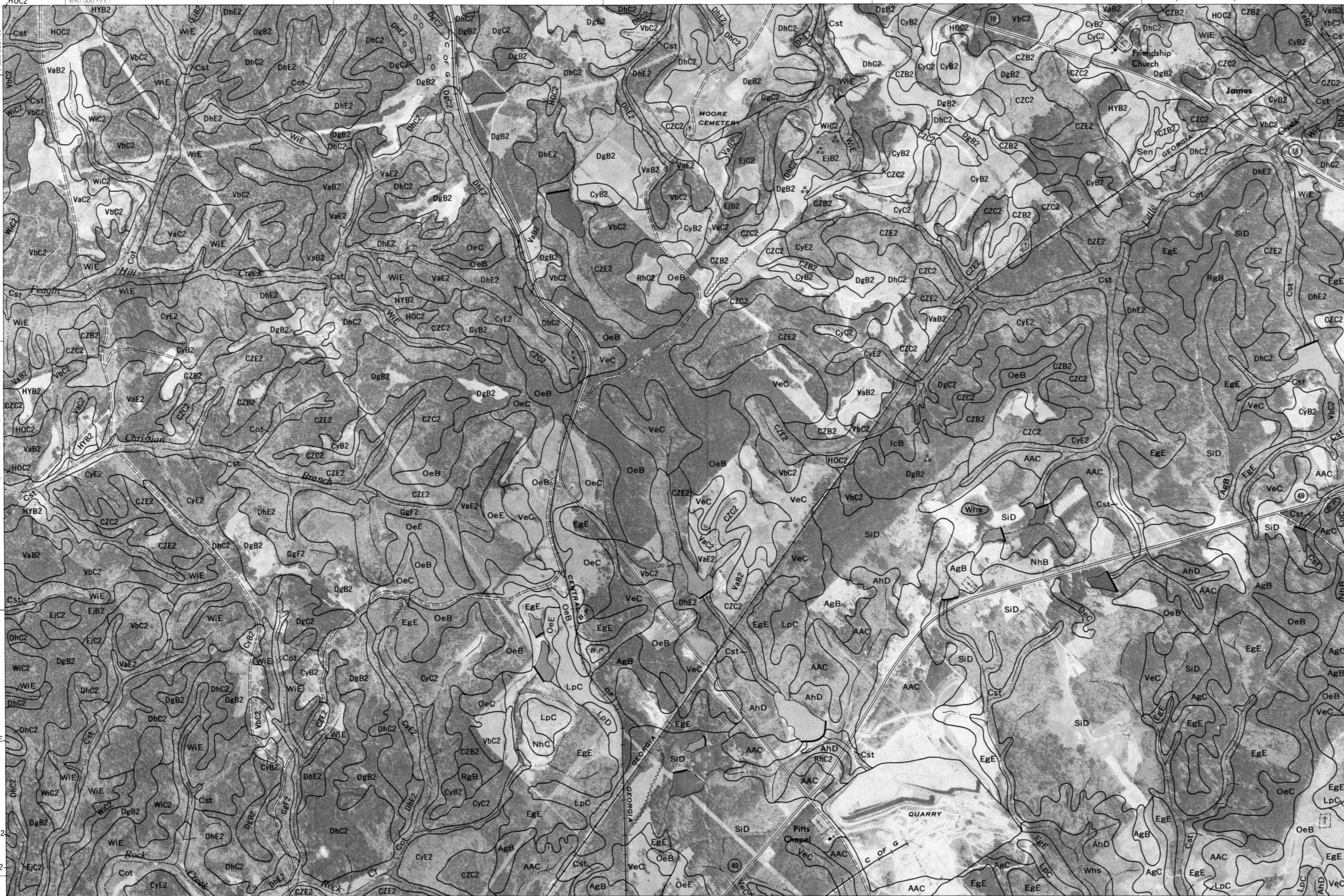

N

Scale 1:20000

0 ¼ ½ ¾ 1 Mile

0 1000 2000 3000 4000 5000 Feet

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(Joins sheet 69)
(Joins sheet 77)
(Joins sheet 79)
(Joins sheet 84)
N
1 Mile
5000 Feet
Scale 1:20000
0
1000
2000
3000
4000
5000
¼
½
¾
1
735 000 FEET
1 080 000 FEET
715 000 FEET
1 065 000 FEET
Little Creek
Commissioner Creek
Crooked Creek
Marys Chapel
WILLIAM WOODS CEMETERY
ETHRIDGE MINTER CEMETERY
B.P.
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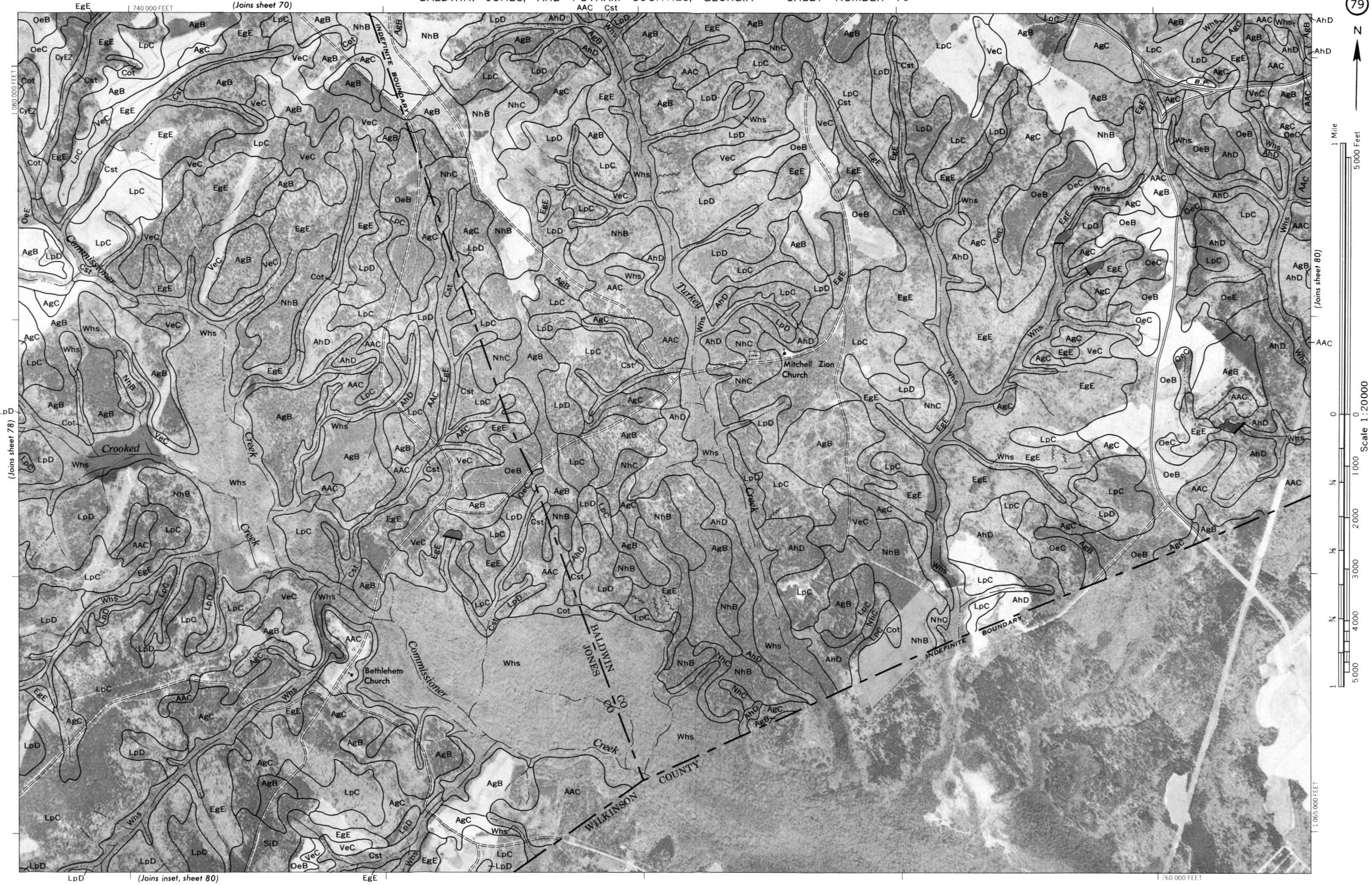

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(Joins sheet 75)

Scale 1:20000

1 Mile | 5000 Feet | 0 | 1/4 | 1/2 | 3/4 | 1

0 | 1000 | 2000 | 3000 | 4000 | 5000

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N
1 Mile
5 000 Feet
Scale 1:20000
(Joins sheet 76)
(Joins sheet 81)
(Joins sheet 83)
(Joins inset, sheet 86)
685 000 FEET
665 000 FEET
1 060 000 FEET
1 050 000 FEET
WALNUT CREEK
Sand Creek
Rock Creek
Dry Bone Creek
St Marks Church
T.V. Tower
BORROW PIT
APPROXIMATE BOUNDARY BIBB COUNTY
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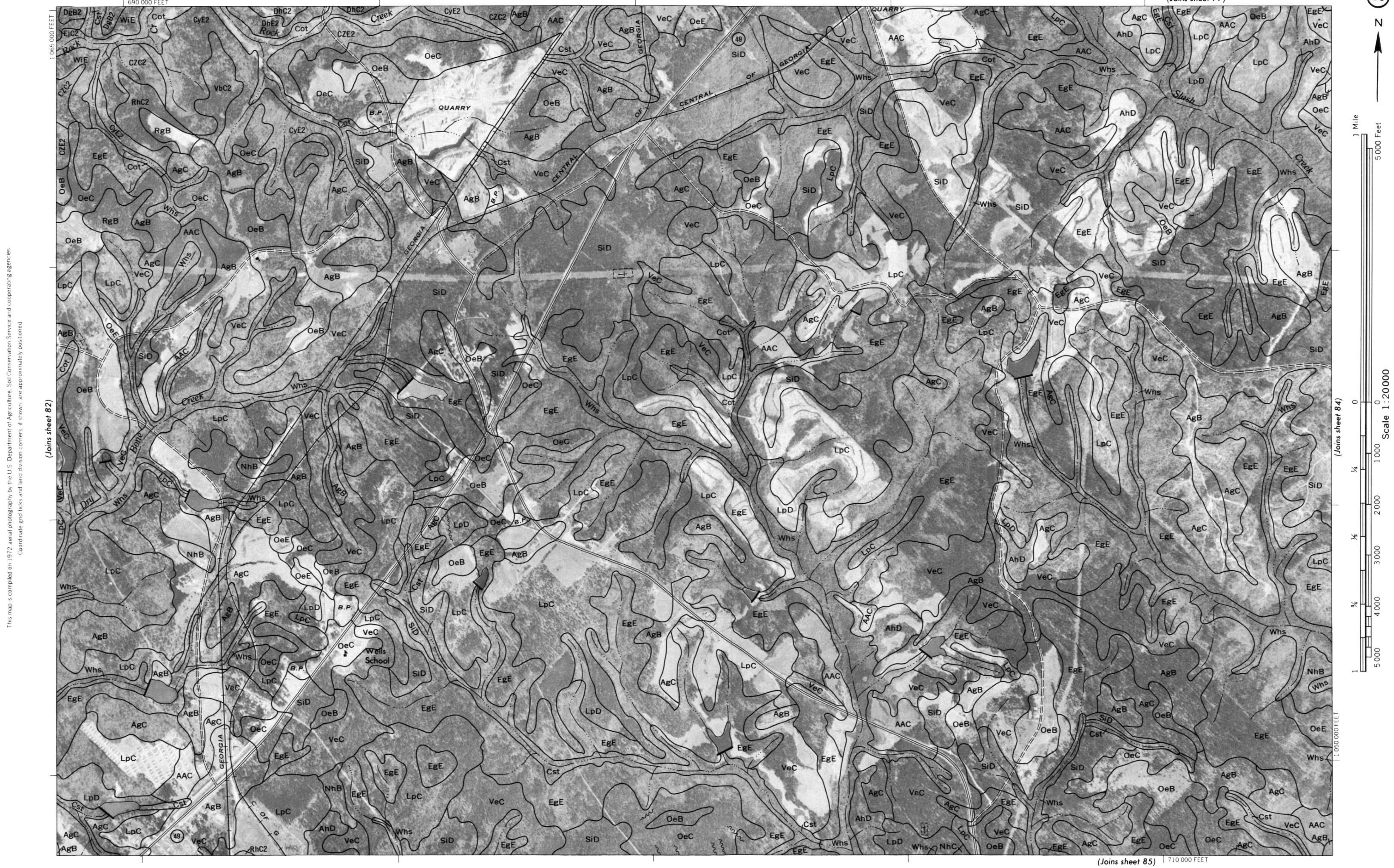
83
(Joins sheet 77)
(Joins sheet 82)
(Joins sheet 84)
(Joins sheet 85)
690 000 FEET
710 000 FEET
1 065 000 FEET
1 050 000 FEET
N
Scale 1:20000
1 Mile
5000 Feet
0
1000
2000
3000
4000
5000
¼
½
¾
1
This map is compiled on 1972 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
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QUARRY
CENTRAL OF GEORGIA
GEORGIA
C OF G
49
Rock Creek
Bone Creek
Dry Creek
Slash Creek
Wells School
B.P.

(Joins sheet 78)

N

1 Mile

5000 Feet

Scale 1:20000

(Joins sheet 83)

(Joins inset, sheet 80)

(Joins sheet 86)

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N

1 Mile
5000 Feet
Scale 1:20 000
0 ¼ ½ ¾ 1
0 1000 2000 3000 4000 5000

N

Scale 1:20000

1 Mile

5 000 Feet

(Joins sheet 84)

(Joins sheet 85)

735 000 FEET

1 045 000 FEET

(Joins sheet 82)

685 000 FEET

1 048 000 FEET

(Joins sheet 85)

EgE

1 043 000 FEET

675 000 FEET

1 035 000 FEET

715 000 FEET

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